

DOCUMENT RESUME

ED 176 114

CE 022 760

AUTHOR Havelock, Ronald; And Others
TITLE Implementing Change in Occupational Education. A Compendium of Resource Papers. Research Publication No. 78-2.
INSTITUTION State Univ. of New York, Ithaca. Coll. of Agriculture and Life Sciences at Cornell Univ.
SPONS AGENCY New York State Education Dept., Albany. Office of Occupational and Continuing Education.; Office of Education (DHEW), Washington, D.C.
PUB DATE Sep 78
CONTRACT VEA-78-3C-891
NOTE 139p.
EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS *Curriculum Development; *Educational Change; *Educational Innovation; *Educational Research; Models; Program Development; Quality Control; *School Improvement; *Vocational Education
IDENTIFIERS Linkage Models

ABSTRACT

Six papers focusing on educational change in occupational education are presented. The first paper, by Ronald Havelock, provides a historical review of innovation research models and discusses how the various models have progressed culminating in the Linkage Model. The next three papers address conceptual issues in innovation research. The paper by Lawrence Mohr discusses the possibility of developing a generalizable theory of innovation, including a preliminary theoretical formulation. Next, Steven Klees presents two views of the change process: the Dominant Framework and the Critical Framework. In the third paper of this set, by John Bowers, the interaction model of school improvement is compared and contrasted with the exemplary model. The last two papers discuss the problems of implementing innovation. First, Susan Klein conceptualizes a nationwide network wherein various individuals play specific roles. Quality control responsibilities of developers, linkers, and users of new products are identified and discussed. Finally, Michael Fullan's paper on the problems of curriculum implementation summarizes the relevant literature and its relationship to critical elements in program implementation. Five elements of change are discussed. (JH)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

IMPLEMENTING CHANGE
in
OCCUPATIONAL EDUCATION
A Compendium of Resource Papers

Colloquia Staff

Vernon Beuke, Project Director
Steven Farrar, Research Assistant
Kip Ault, Research Assistant

Cornell Institute for Research and Development in
Occupational Education, Department of Education
New York State College of Agriculture and
Life Sciences, Ithaca, New York

In Cooperation With

The Office of Occupational Education
New York State Education Department
Albany, New York
Research Publication 78-2

September 1978

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY.

Funds for this project were provided by Section 122 (a)2 of the Vocational Education Amendments of 1968, administered by the New York State Education Department.

VEA-78-3C-891

CONTENTS

Introduction	1
Overview of the Papers	3
Part I - A Historical Review of Innovation Research Models	7
Linkage Perspective on Educational Change	9
Dr. Ronald Havelock	
Part II - Conceptual Problems in the Study of Education Innovation	25
Discussion of <i>Toward a Theory of Innovation</i>	27
Dr. Lawrence Mohr	
Economics, Communications, and Educational Innovation	51
Dr. Steven J. Klees	
Two Perspectives on Intervention for School Improvement	71
Dr. John E. Bowers	
Part III - Implementing New Programs	107
Possibilities for Increased Quality Control of Instructional Materials and Programs.	109
Dr. Susan Klein	
Problems of Curriculum Implementation	123
Dr. Michael Fullan	

IMPLEMENTING CHANGE
in
OCCUPATIONAL EDUCATION
A Compendium of Resource Papers

Introduction

The study of innovation and innovative behavior has captured the interest of social scientists over the past quarter century. In that span of time, there has amassed a vast and heterogeneous literature, virtually unparalleled in volume and complexity. Still, the existing literature base is thought by many to be inadequate from a scientific viewpoint. Giaquinta (1973) characterized the bulk of the research as "show and tell" literature which evidences little methodological sophistication. Berman and McLaughlin (1978) note that few studies have attempted to "test theories of change or identify components of success or failure." Others, including Rogers (1972), Havelock (1975), and Zaltman and Duncan (1977) believe there exist some basic principles, almost universally agreed upon, which provide guidance for change advocates. All agree, however, that efforts to generate specific theoretical formulations are frustrated by unresolved methodological and conceptual issues.

In no endeavor is innovation implementation research more critical than in occupational education. The knowledge base of occupational education, communicated through the curriculum, must accurately reflect the real world of specific job-related skills, abilities, knowledge and attitudes. The occupational educator, as a matter of routine, must be able

to wear several hats with comfort. These include those of the teacher, the craftsman, and the job analyst. Hence, the occupational teacher must not only know the new technologies and skills, but also be able to assist the learner to acquire and demonstrate these at an acceptable level of proficiency.

We live in an era of accelerating technological change, with little chance that the pace will slow. If occupational education is to remain a viable source of training and education for the market place, it must continually access the resources of the basic and social sciences. Not only must these resources be accessed, they must be interpreted for the classroom. It is paramount that mechanisms exist whereby new knowledge and skills can quickly blend with or supercede the old.

Responding to this need, the Cornell Institute for Occupational Education (CIOE) and the New York State Education Department hosted a series of lectures on the topic of implementing innovation in educational organizations. Cognizant that innovation research has not been the domain of a single discipline, but has crossed many of the traditional scholarly boundaries, contributors to the series were drawn from many fields including political science (Mohr), economics (Klees), social psychology (Havelock), psychometrics (Bowers), educational psychology (Klein), and sociology (Fullan). These researchers were invited to present their views and ideas on implementation of the Instructional Support System for Occupational Education (ISSOE) curriculum in New York State. Each lecture was tape recorded and transcribed. The edited papers summarize the

"State of the Art" in educational change as viewed by theoretician and practitioner. By focusing on theory and practice, we hoped to provide pertinent and valuable information for those who are responsible for occupational curriculum implementation.

Credit is due Steven Farrar and Kip Ault, research assistants, for their assistance in editing the papers, and to Caroline Cornish for typing the manuscript.

Overview of the Papers

This collection of papers is organized around three themes: a historical recap of innovation research; three papers addressing conceptual issues in innovation research; and, two papers discussing problems of implementing innovation.

The first paper provides a concise recapitulation of the historical development of innovation research. In it, Dr. Havelock discusses the evolution of the research models most often used in the field. He shows how the various models have progressed as the field has matured, culminating in the Linkage Model.

The next section includes three papers which address conceptual issues in innovation research. The Mohr paper discusses the possibility of developing a generalizable theory of innovation. Several pertinent issues are identified including "instability" of variables and lack of good definitions. The author presents a preliminary theoretical formulation which includes the elements of a general theory of innovation.

Dr. Steven Klees, author of the second paper in this section, presents two views of the change process. These are the Dominant Framework and the Critical Framework. The Dominant Framework views change from a traditional perspective. This is exemplified by a benefit-cost approach to new products. The Critical Framework states that the social system is self-preserving in that radical ideas are effectively rejected which might upset the status quo.

In the final paper of this section, the "interaction model" of school improvement is compared and contrasted with the "exemplary program model" by Dr. Bowers. The exemplary model, widely used during the past decade, requires faithful replication of a proven educational program or product. It is characterized by Bowers as a "black-box" model, based on the questionable assumption that competent implementation of an exemplary program will produce similar results.

In contrast, the interaction model begins with the assumption that a given intervention will never be the same "thing" in two different school settings. The intervention interacts with the user to produce the program. Thus, the goal of an intervention should be increased student performance, not faithful replication of a package deal.

In the third section, two knowledgeable researchers look at implementation of new programs. Dr. Klein conceptualizes a nationwide network wherein various individuals play specific roles. Professor Fullan looks more closely at the implementation of new curricula at the school level.

Klein believes there are two mechanisms for increased quality control: evaluation and review. These are important at each level of program development and implementation. Quality control responsibilities of developers, linkers, and users of new products are identified and discussed.

The Fullan paper summarizes the relevant literature and its relationship to critical elements in program implementation. Five elements of change are discussed. These include organizational change, curriculum change, behavioral change, attitude change, and changes in the teaching-learning process. Dr. Fullan believes that some important determinants of change are not under the control of change agents. These are, however, factors which must be taken into consideration.

PART I

A HISTORICAL REVIEW OF INNOVATION RESEARCH MODELS

LINKAGE PERSPECTIVE ON EDUCATIONAL CHANGE

An Edited Version of Remarks by

Dr. Ronald Havelock

May 1978

LINKAGE PERSPECTIVE ON EDUCATIONAL CHANGE

by Dr. Ronald Havelock

Although my background in social psychology may explain some of my biases, I have not been a practicing psychologist for a number of years. Once in the field of innovation and change, I soon realized I was dealing with systems--not individuals. Yet, my systems model may appear more like a person model than a group model.

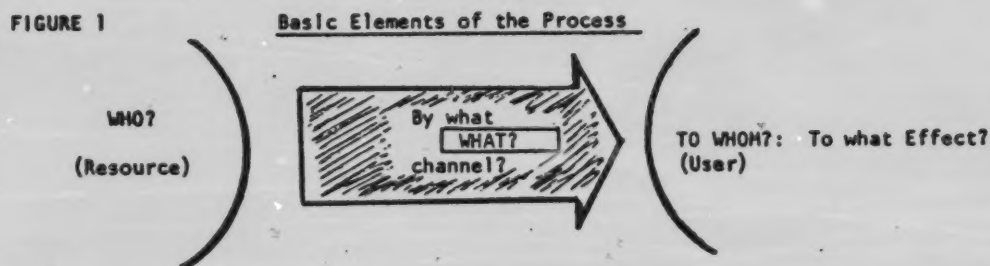
Originally, I entered the field as a graduate student at Boston University. At the time, the University of Michigan's Institute for Social Research was given a small grant to look at the problem of research and utilization. I suppose it was the largest university based institution exclusively conducting social research at that time. The grant they were given allowed them to explore the problem of research utilization in a general way. They held a seminar and invited representatives of different fields of innovation application such as medicine, agriculture, art, technology, etc. A number of different fields appeared at this seminar, and they compiled huge amounts of materials, as the project people asked them all the questions they could think of regarding research and utilization, and how that flow of research influenced practice. The concern was not with research, but with research in a practical way.

They transcribed the seminar, and then were troubled by what to do with the material. A Boston professor, who was on sabbatical offered to take it and finish the job. Well, he had trouble with that, so he asked me to help. When I started I realized that we needed organizing frameworks; that is, grids into which we could organize information. So, I developed grids which I felt covered the entire area.

In a way, one could agree that the problem of innovation is a problem of two cultures: 1) Research, and 2) Application. In the grossest kind of simplification there are some people who feel that all of the answers to the problems of society, and the only legitimate source of knowledge come from the Research culture. This culture is represented by the academic community, universities, experts, specialists, etc. These same people think the world of application, if it wants to behave optimally, should adopt whatever it is that is supported by the research culture. Of course, things don't work that way, which is why the "two separate cultures" model fits very well. So, on the one hand are the people just described, and on the other, those who firmly believe that any kind of change that is brought about, must be initiated, invented, and developed by the people who actually have the problem--the practitioners. According to this view, if held in the extreme, the only way of helping practitioners is through self-help. Thus the ideological and theoretical battles that go on in the field of educational change represent, to my mind, a tension between the research and application cultures.

In general, my work has been an attempt to either rationalize or resolve that tension, to bring the two cultures together to form a link, on the most general level, which maximally benefits practice. That puts me squarely in the space between the two cultures.

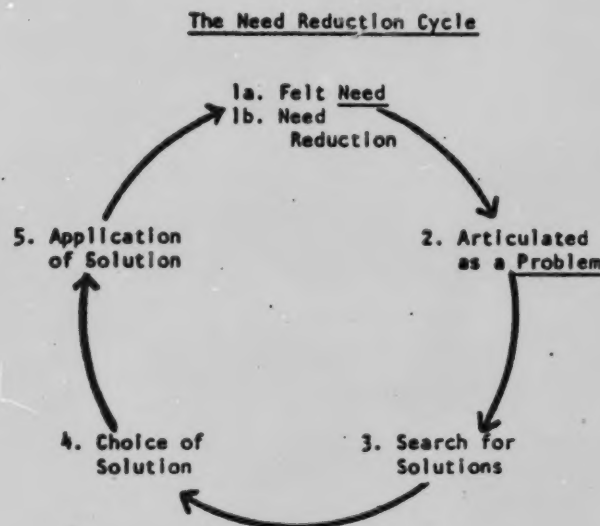
The original model (Figure 1) was a communication model which focused on "resource" and "user" and described a message (a piece of research), a sender (researcher or some interactive device), and various recipients. That was, to some degree, the model we originally followed. It is, to this day, the most useful and simple paradigm to apply to this area. Figure 1 should be viewed as a flow process from left to right.



It was a very useful approach. In a later project, however, I had an opportunity to do an exhaustive review of the literature. I found that there were hundreds of studies that could be categorized under characteristics of the message, characteristics of the media, characteristics of receivers, various resistant factors, etc. It became apparent to me, as a

psychologist, that this way of treating the receiver, as a passive object of messages, inadequately explained many phenomena. Therefore, I included in the new formulation some notion that something was going on inside the user system (Figure 2).

FIGURE 2



This activity included a process which creates a need, a gap, or some situation requiring action. This stimulus--response model is the most primitive problem solving model. Our current research focuses on determining what's going on inside the user system that matches or doesn't match the information coming from outside the user system. The user system could organize its internal processes in many different ways to come up with the satisfactory solutions, but most models elaborate on a disturbance-action-resolve-disturbance model. The first level of elaboration defines a disturbance (which we'll call a need) or offers a guide to be used for diagnosis.

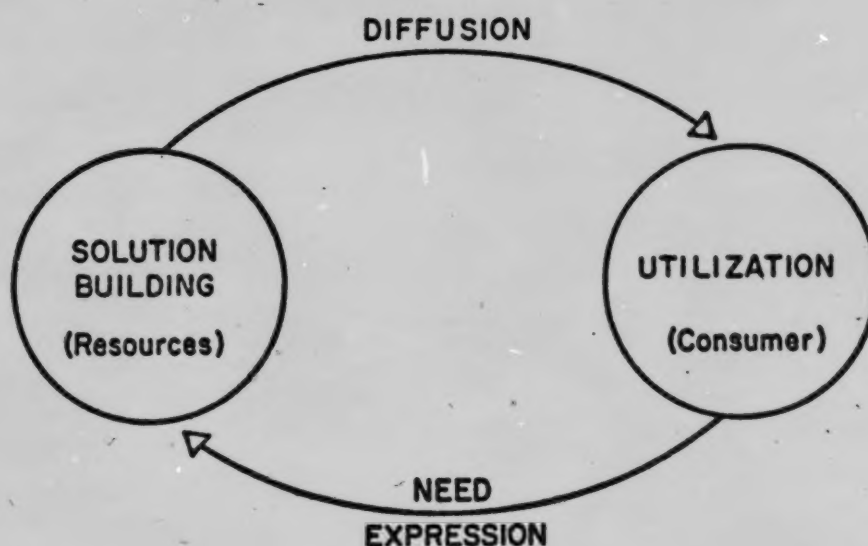
Out of this diagnosis might come a search for solutions, ideas, or resources in the environment. As we move to a clearer definition of problems and to more diversified searches, we are increasing the likelihood of finding an optimal solution. A solution, discovery or choice process might derive from the research. Further you might distinguish a test or trial phase in which you try one or more solutions to see which one works best. This, hopefully, will bring you to full circle to resolve the disturbance so that it can at least be re-defined. This, in a way, is a researcher's notion of what a practitioner's problem solving process ought to be, if it is going to be fairly rational. In real life, we are painfully aware that people in general tend to use an "immediate response" mode of problem solving.

In a way, I may be going beyond the realm of empirical reality in proposing such a rational sequence. The point is that practitioners solve problems with their own internalized cycle, which tends to be different from the problem solving processes of those who might be involved in helping them.

Now, one could legitimately ask: "Since you are concerned with change, why not simply focus entirely on helping systems develop more sophisticated problem solving systems for themselves?" A lot of people in the educational change business do take this point of view, and they focus entirely on helping the process issues, on helping systems help themselves. Some have a very mechanistic approach to this, while others have a T-group approach. They argue back and forth about which is the best basis for organizations.

My focus has not been particularly on articulating systems of internal problem solving per se. I feel it is only a part of the total picture. I have assumed as given that this useful resource was external to my use-system, but as a practical fact of reality, this is only sometimes the case. Then I came to a formulation which is approximated by Figure 3.

FIGURE 3. The Problem Solving Dialogue



Essentially, in order to have a satisfactory total process of innovation, one which involves outside resources, four fundamental and different processes must be included. I propose that we have a diffusion of information--a communication process which prompts the research culture into uses of their research. Additionally, I propose that for this to happen we need to think of another set of processes which I call utilization. Without this additional set of processes, you are simply getting a message across to somebody. No action need follow. So we have to consider utilization. Does it enter into this or any other kind of cycle? How can it become part of an operating system and its internal procedure?

The third process concerns the fact that if any concerted effort to bring about improvement is to have meaning, then presumably, the meaning will derive from the original disturbance. For any external service system to be relevant, it must speak to the needs of the user system. Thus, it is no trivial matter to get users to articulate their needs.

It is desirable to differentiate many substeps, particularly if we talk about changing the society as a whole. There are many different aspects and complex processes. No single event brings change about. Diffusion, utilization, etc., subdivide into various components which I earlier mentioned (such as articulation of need, and influencing of decision making processes in the resources sector).

Finally, there is the process of solution building, which could be subsumed under the category of R & D. The important issues in change involve what I call the problem solving dialogue. To successfully bridge the gap between research and practice, you can view the problem in either one of two ways. One is the problem of barriers. One barrier was discussed when we were talking about two different cultures. A similar barrier is that of problem identification and definition. Researchers tend to define problems quite differently than practitioners. Further research and development processes can look quite different from the various points of view when applied in localized problem solving processes. For example, one of the differences is that there's almost always a much tighter schedule for problem

resolution in the practitioners area than the research area. The problem solving cycle in research ranges anywhere from 5-50 years, whereas in the practitioners' culture, it may go from five minutes up to one year, rather than beyond one year.

We also have the problem of an entirely different set of values. The important values of practitioners are essentially to serve people, to satisfy immediate needs, to improve, but maybe more importantly, to maintain a society with a certain amount of function. On the other hand, the researcher's values are primarily oriented toward the development of knowledge, pursuit of truth, and developing a system derived from truth. As I have shown elsewhere, it is possible to analyze the barriers or resistances on both sides, each of which are derived from facts related to each culture.

There is another problem between the two cultures. This is the problem of matching processes. Basic Havelock doctrine states that in order for knowledge to be useful, it must feed into the user system's problem solving processes in the right way, at the right place, at the right time. In order for that to happen, the resource system must be coordinated in such a way as to allow it to mimic the users' processes. They must know not only that they can get through the barriers; but, once they are through, they must understand what kinds of things are needed, at what place and when. They need to know the what, where and when of the various openings to change.

Along these lines, I developed the notion that in order to have effective communication, one has to have meta-communication. In other words, to create a coordinated process, one has to talk about communication, not just communicate. Developing this notion further, which is part of "Linkage Doctrine", the successful research system gets information to the user system so it (the Research

System) can simulate what's going on. At the same time, it is inappropriate to say the whole obligation rests with resources. On the contrary, it develops systems in which users are able and willing to go to the trouble of understanding what research is all about.

I've talked so far about a process that would appear to be bi-lateral, for two systems only. I do believe you can view the world that way. That is, it is useful heuristically to look at a situation, however complex, and to divide it more or less into the resource side and the users' side. We should keep in mind that we are talking about the chain of inter-system connections. In order for a total society to work, it must have these inter-system connections among a whole series of organizations. Now, I put forward a proposition that each link has an inherent process and requires the same dialogue process which on a micro-level links two "roles" or two systems.

One might ask: "Now what? If something is this elaborate and complex, how does change ever happen?" There are several answers. One is that as relationships develop they become increasingly efficient communication channels, building trust as they do so. At the point where you understand what a user's situation is, you need not go through the total problem solving cycle every time a need is communicated. In a general sense, this is what learning about another's systems is all about.

By the same token, you have a user who has had a successful encounter with an outside resource center. He is likely to go back to them again and again, as long as they address his needs, and remain reliable sources of requirements, etc. So one of the savers is that the trust building process,

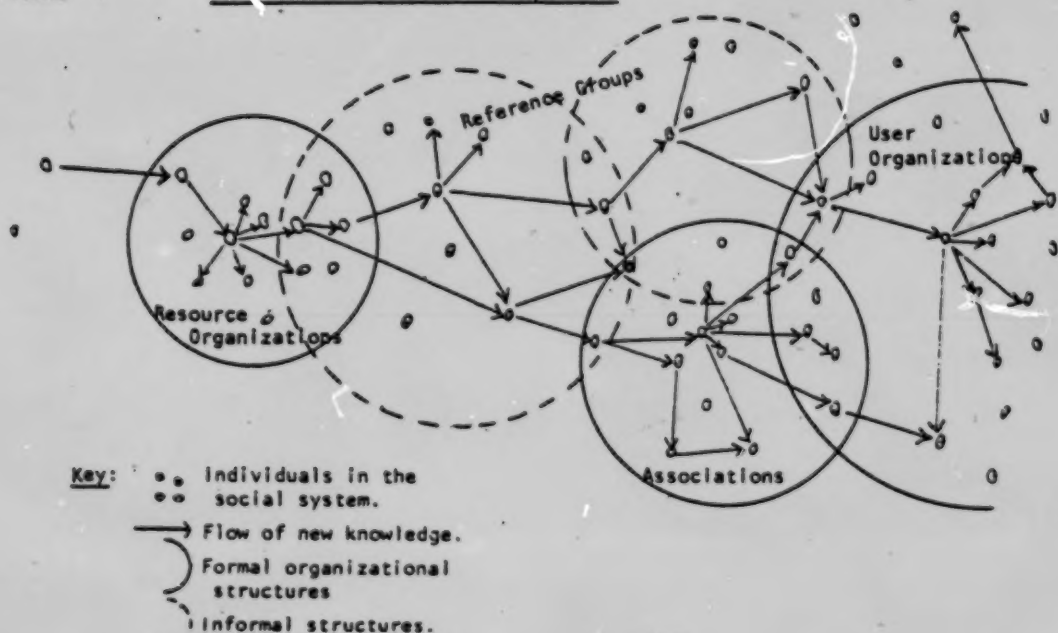
which is inherent in establishing linkage over time, can be a very efficient method of two systems essentially merging into one, or two systems functioning from one which is shared. A second saver is the fact most people change and adopt change, not because of any rational acceptance of somebody else, but because other people are doing it. In other words, people are influenced by other people who belong in their social network. A superintendent, if persuaded to accept something, causes a chain of events to happen in his organization. But, the chain of events need not occur in such a hierarchical fashion. A farmer could make good contacts with an experimental station, which might cause him to adopt some new practice, which might be sufficient to cause many others to adopt the same thing, thus helping to bring about change through the effect of social interaction. In every social group, there is an informal subdivision. Some people tend to be innovators and naturally start new things. Others tend to lag and adopt new ideas very cautiously. Some tend to be leaders of various teams; others, members of many coordinated teams; and so on. Some opinion leaders are conservative by inclination. If you have a social system in which many hold conservative views, you may have some difficulty bringing change about. Generally speaking, however, opinion leaders tend to pay more attention to innovators within their own systems. The trick to becoming and maintaining yourself as an opinion leader is to adopt ideas whose time has come. You don't want to be too early, the status quo may be sufficient, and you don't want to be too late because you lose leadership.

So, the interaction process is a significant saver. It allows an elegant process of linkage to take place and creates a phenomenon which represents the great opportunity derived from research studies of change. Social influence results in multiple effect. Through an initial small targeted effort, innovators and a core of practitioners do developmental work and create a product that has some relative advantage over existing practice. Regardless of whether the innovation is ultimately beneficial, once you get the critical mass of opinion leaders, then significant adoption occurs very rapidly.

In one paper I proposed three different perspectives on the process of change. One views change simply as a matter of people influencing other people, without regard to the context involved. I call this the "Social Interaction" perspective (See Figure 4).

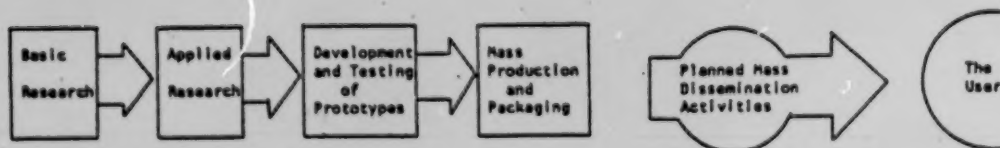
FIGURE 4

The Social Interaction Perspective



The second perspective, often referred to as the Research, Development and Diffusion model (see Figure 5), looks almost entirely at the process of transformation of knowledge into problem solutions and is very popular in the commercial sector of our society. It was very popular in the 1960's with the massive types of educational planning. You can easily track this perspective in certain areas or parts of technology, in agriculture, medicine, and, to some extent, education. Educators attempted to apply this perspective on a wholesale basis to educational problems in the 1960's. This approach became discredited due to its failure in the education sector, as it seemed to ignore the fact that you've got to have something useful flowing in the pipeline. It further failed to realize that you need articulated processes to come up with some of the important parts of change.

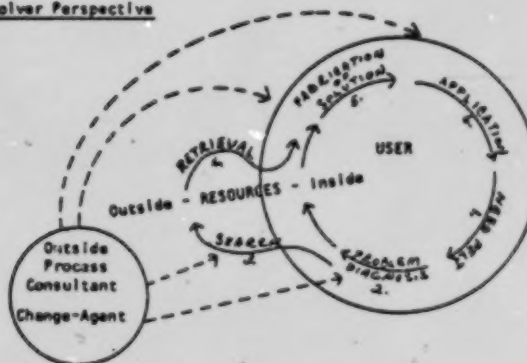
FIGURE 5 The Research, Development and Diffusion Perspective



These processes contrast with what I call the "Problem Solving" approach (see Figure 6). The problem solving process is much more a user oriented activity which essentially discounts both the role of social interaction or the idea of people influencing people. According to this, what the user does for himself is the key to the whole thing. If there is a role for outsiders, it is that of being a process consultant or helper so people can help themselves. The focus is much more on the user of internal rather than external resources.

FIGURE 6

The Problem-Solver Perspective



The "Linkage" approach (Figure 7) starts with this model, elaborates it and puts more stress on the fusion of outside and inside resources to achieve change. It attempts to do this without denegrating one or the other, and by developing some sort of way of capturing the much larger resource universe that is available, particularly in a society like ours which has all kinds of people with all kinds of talents.

At this point, I'd like to take some time to discuss your particular problems and answer any questions you may have.

FIGURE 7

The Linkage Process



From the Linkage Perspective:

1. Resource system must recapitulate or adequately simulate the user's problem-solving process.
2. The user must be able to understand (and simulate) the research, development, and evaluation processes employed by the resource system in the fabrication of solutions.
3. Resource and user must provide reciprocal feedback.
4. Successful linkage experiences build channels for efficient dissemination.

PART II

CONCEPTUAL PROBLEMS IN THE STUDY
OF
EDUCATIONAL INNOVATION

DISCUSSION OF TOWARD A THEORY OF INNOVATION

Lawrence Mohr

May 1978

DISCUSSION OF TOWARD A THEORY OF INNOVATION

Lawrence Mohr

I became interested in the study of innovation as a graduate student and conducted my doctoral research on the adoption of innovation by public health officers. After I wrote my dissertation, I tried my best to forget it and did that successfully for a number of years. I conducted research on a variety of topics during this period and actually it was the field of education that got me back into innovation research. I was invited to a conference which was part of an effort to lay out a research program for the National Institute of Education on the organizational aspects of education. My own major job at the conference was to set out the state of the art as it concerned innovation research. When I started to deal with this task, I realized that the field of innovation was really plagued with a lot of conceptual problems that people just weren't bothering to address. What we had was a lot of empirical research being done. Everett Rogers, with whom many of you are familiar, keeps track of these things and I think that Rogers' bibliography is now up around 2800 research items. This research was being done without addressing the conceptual problems which were obviously there and which impeded progress almost totally. I thought it was time for someone to do a paper which addressed these issues. As a result, a colleague and I wrote "Conceptual Issues in the Study of Innovation." We did that, and while it was difficult to do, it was even more difficult to get it

accepted for publication. Journal referees do not seem to be interested in such problems. But we succeeded in doing that, also. Subsequently, then, there was the challenge: "Well now, you have pointed out all of the problems that exist, or a lot of them, and you have shown us why it is so difficult to produce a theory of innovation. Are you going to leave it there?" We knew it would be "chickening-out" to leave it there. Besides that, the National Science Foundation indicated to us that they might make some money available to us to do a little more thinking about this subject in a more constructive vein. So George Downs and I got together again, and we did a second paper entitled "Toward A Theory of Innovation."

Well, I think that many of you may approach the question of innovation as practical people. That is, I think you are interested in education, and interested in good education. You can see that there are barriers to good education. Some of you may even think that there is so much innovation that innovation itself is one of those barriers.

I come at the study of innovation a little differently. My personal bias is to be interested in theory, rather than in application. But I accept the challenge of trying to make this theoretical stuff interesting to people who are looking for better or easier ways to get a practical job done.

There are, of course, hundreds of studies of innovation, many, many of them being empirical studies. The thing that we realized is that they are not adding up to anything! They are not cumulative. For example, take Rogers' book called Communication of Innovation. He has an appendix in that book which reviews the different variables that have been studied in innovation research. He takes each variable and goes

through the number of studies in which it was found actually to be a significant correlate of innovation. For every variable he mentions, he finds about 35 studies in which it was significantly related to innovation, 15 or 20 where it was not, and maybe 5 where it was significantly related in the opposite direction. You might well step back, as we did, and say, "It seems ridiculous to have a field where people continue to turn out this work in such volume and it doesn't lead anyplace or go anywhere."

There are, however, some people who don't feel that way about innovation research. Everett Rogers, I think, is one of them. He feels, and many others feel, that we just need to be patient and the truth will gradually or suddenly shine through. That may be accurate, it's hard to say, but I, for one, don't happen to believe it. I feel that we can go on forever doing this kind of research and the truth will never shine through. We will be in exactly the same position twenty or thirty years from now as we are now, except that there will be 6800 studies instead of 2800 studies of innovation.

When George Downs and I looked into it we decided that there are several reasons for the research-results phenomenon that we labeled "instability." By instability, we mean that the causal impact or importance of each determinant of innovation bounces around, being unstable from one study to another. Sometimes it is important and sometimes it is not. Sometimes it is important in the other direction. That is what we mean by instability. Because of it, we don't know whether the factors studied are responsible for innovation or not.

There are, to make things short, two overriding reasons for instability. One of them is the phenomenon of interaction. That is, interaction in the statistical sense. Interaction is sometimes called the "it-depends" phenomenon, meaning that you can't say that a particular variable by itself is important. If somebody asks if a given variable is important, the answer has to be, "It depends." Few if any studies have really dealt with interaction properly.

We made a big thing about interaction and we were very gratified to find later that other scientists in other disciplines were also making a big thing about interaction as an obstacle to progress in theory building, particularly in the social sciences. For example, in education, Lee Cronbach at Stanford University has practically said "I give up! There is no possibility of developing a theory of learning. I used to think that introducing some interaction terms would do it but now I see that it is still insufficient even to go to 7th and 8th order interaction and my conclusion is that such complexity is impossible to deal with." Although we find the same thing exactly in innovation research, we're not as pessimistic as Cronbach about getting over it. We still think general theory is possible. I will spend the greater part of the discussion today sharing some ideas about how to get around the need for so many "it-depends" terms that theory cannot progress.

In innovation research one of the important sources of interaction, but not the only one, is interaction between various organizational variables and the kind of innovation you are talking about. Is organizational variable X important? It depends on the innovation that you are considering.

For some innovations this organizational variable is important and for others it is not. And, that is one of the kinds of interaction that you find in innovation research.

This problem has caused people to make typologies of innovations. It depends on whether you are talking about a technological innovation or a programmatic innovation. It also depends on whether you are talking about an expensive innovation or one that costs nothing. In the literature you find another typology, based on whether or not the innovation is a radical departure for this organization. And a great many others have been offered. So what's important seems to depend on the kind of innovation, and that's one sort of interaction.

But that's not the only sort. In my dissertation research, for example, the original article I published on innovation made the point that if we were going to have a theory of innovation it was going to be a multiplicative theory. That is, a theory that is based on interaction. The interaction I had in mind then was between the very abstract concept, "motivation," and another highly abstract concept which I called "resources." I elaborated on these two concepts by saying that innovation depends on the motivation to innovate, and on the resources available to innovate, but does not depend on those things in an additive fashion. It depends on them in multiplicative fashion in the following sense: Let's say that the motivation score is 5 and the resources score is 5. You might think that the innovation score would be five plus five, or ten. Or, let's say that motivation remains five and that resources become zero. The additive theory would say that the innovation score would be five; the multiplicative theory says that the innovation would

be zero. And, for me, that makes more sense, because not all the motivation in the world is enough to overcome zero resources. The same works the other way around. If the resources are five and the motivation is zero you are going to get zero innovation. That's another kind of interaction I believe is inherent in a theory of innovation -- the interaction between the motivation and the resources.

There are still other kinds of interaction. For example, it is said that the degree of decentralization of the organization is important. Well, that depends on how homogeneous the values are of the people in the organization. If the values are quite homogeneous, it doesn't matter if it is decentralized or not, because everybody is going to make the same decision. But if the values are quite heterogeneous then a different decision might be made in the periphery than is made at the top of the organization. So this is interaction between two ordinary organizational variables, decentralization and homogeneity of values.

The other primary source of instability of causal impacts of variables upon innovation, besides all of this interaction, is the way people have defined and conceptualized the phenomenon of innovation. People use the word very loosely and they are not always talking about the same thing. It is, therefore, no wonder that you get a different impact of wealth, or almost any other variable, in one study than you do in another. This is especially true when you find that one study investigates, for example, the extent to which an organization becomes committed to an innovation while another studies the earliness with which an organization adopts the innovation. They are both called "innovation,"

but they are certainly very different. Hence, the same variables have different impacts in different studies because of these different conceptual definitions of innovation.

Well, that is a very very brief summary of what George Downs and I did in this first paper called "Conceptual Issues in the Study of Innovation." In the second paper we said, "In full awareness of these problems, let's try to outline a completely integrated general theory of innovation nevertheless. What would such a theory look like?"

We are, I think, very humble and modest about our ability to succeed in doing this by just sitting down and thinking about it, but I think that we both felt that it was an effort worth making. Even if we fail to arrive at a general theory, it could illuminate the study of innovation to the point where further efforts might have greater payoff, or at least some payoff.

Telling about our attempts to construct a general theory of innovation really has the potential for putting people to sleep. But, in another sense, it is an interesting question. It is an intriguing question in this way: You have to construct a general theory of innovation because nothing less will do. The attempts to construct a theory using five ad hoc variables and somebody's Thursday definition of innovation have not gotten us anywhere. The people at the National Science Foundation who funded our second paper are primarily interested in the dissemination of technological innovations. They could not learn anything from the existing literature that would reliably enable them to get industries or public agencies to adopt certain innovations. Every new situation

seems different. The main thing they've learned in trying to apply the literature is, "Well, it's very complicated." Therefore, if you don't have a general theory of innovation, one that is universally applicable, then you have none. It is all or none.

That is one side. The other side is it may be impossible to arrive at a general theory of innovation after all. This is where I am after lots of thinking, and writing. I think it may just be impossible to do. Not hard, but impossible. It may be impossible because the kinds of things that affect whether people innovate may possibly be ephemeral and changeable enough, without a basis in anything stable or durable, that you can't have a general theory. Every situation is different.

That's why I find the idea of trying to construct such a theory of innovation to be quite interesting. Because, if nothing else will do, and yet it is impossible, then where does that leave you? What shall we do as scientists? Well, we're going to push to see whether it is possible or not, but be prepared to fall and reassess at that point if necessary.

One of the things that we consider important, and people seem to think this has some potential, is called the "innovation-decision design." In our theory, the unit of analysis is not an adopter, nor is it an innovation, even though most innovation studies have been of one kind or the other. Studies of organizational variables investigate the kinds of things which make one organization adopt innovations quickly whereas another organization adopts things slowly. Hence, organizations are used as the units of analysis. There have been lots of other studies, particularly in agriculture, that have investigated factors that make one

innovation spread and be adopted very quickly, whereas another innovation takes a long time to diffuse. That is, the innovations or new ideas, are used as the units of analysis.

The innovation-decision design says we scrap both of those. Our unit of analysis is an organization or adopter in juxtaposition with an innovation. If you are studying a hundred organizations, 100 school districts, let's say, and they have or have not adopted ten particular innovations, your N is a thousand. Each organization in relation to each innovation is one point on a scatter plot. Why that gets over some problems is quite interesting. There are several reasons. When you make the unit of analysis the organization as it faces an innovation, you can get the characteristics of the innovation and the characteristics of the organization into the same data set. Remember we said that one way in which the "it-depends" phenomenon makes itself felt is to ask, "Is such and such an organizational characteristic important?" and to respond that it depends on the kind of innovation. But with the innovation-decision design, it turns out that you can not only put the organizational characteristic into the data set, but you can also put descriptors of the kind of innovation into the same data set. You can't do this in the traditional study where you are looking either for differences among organizations or for differences among innovations. This is one of the very, very important advantages of the innovation-decision design.

Take another organizational variable, for example, wealth. Sometimes the wealth of the organization is important; sometimes it is not important. When is it important? It is important if the innovation

is expensive. What if the innovation doesn't cost anything? Then it probably won't matter how wealthy or poor the organization is. For example, changing to participative management from autocratic supervision doesn't really cost anything. You have the same people; they just behave differently. The organization's wealth would not seem to matter in this case; the poor organization can innovate just as easily as the rich. With the innovation-decision design, the wealth of the organization is part of the data set and so at the same time is the cost of the innovation. In a typical study of innovation adoption, there are some innovations that are cheap and some that are expensive. For each, you will have some organizations that are poor and some that are rich. Therefore, you can in that data set have an interaction term of wealth with cost and find exactly the coefficient on the product of wealth and cost. You can use this to get at the impact of certain factors under varying conditions. But, not only that, you can also use this design to get at the factors themselves! That is, you don't really know whether or not an organization is decentralized in a study of innovation until you look at the innovation concerned, because organizations are not simply centralized or decentralized. School districts, for example, may be highly centralized with respect to some decisions, such as planning for population growth, and very decentralized with respect to other decisions, such as certain curriculum changes. It depends on the kind of innovation you are talking about. The innovation decision design, which mixes the two basic elements, allows you to call an organization centralized when it is thinking about one innovation, and call the same organization decentralized when it is thinking about another.

This means, then, that one does not try to develop a theory of what makes one organization quicker than another to adopt innovations, nor does one try to develop a theory of what makes one innovation quicker than another to diffuse. Rather, both of those now are commingled in one overall theory that says what produces innovation -- a theory that says what characteristics of organizations and innovations lead an organization to adopt or not adopt when it confronts a particular innovation.

That is exciting to some people because where they had an N of a hundred before, they now have an N of a thousand, and everything they study is significant.

However, it has some disadvantages. For example, as we were talking today, Dr. Beuke was wondering if the ISSOE innovation is going to catch on? Is it going to diffuse? I didn't really respond to that concern in talking to him about it, but my answer at this point is: You cannot tell by simply comparing this innovation with another. The only way you can answer the question, "Will this innovation diffuse and be accepted quickly or slowly?" is to say, "Will this teacher adopt it? Will that teacher adopt it? Will the other one?" and go through every potential adopter and plug his characteristics into the model. We then get some kind of an answer over all those teachers. Because this design considers each juxtaposition of an organization and an innovation as one separate thing, the only way that you can arrive at a conclusion about a particular innovation is, not to compare it with four or five other innovations, but to aggregate up from its possible confrontation with every single adopter that might adopt it.

Well, of course, the smart thing to do is to take your potential adopters and try to categorize them in three or four categories so you don't have to actually consider every teacher. But the point is that you have to think in those kinds of terms in order to answer the basic question once you give up a theory of organizational innovativeness, and give up a theory of adoptability or diffuseability of innovations, and take up the innovation-decision design. It is a basic conceptual change.

The big advantage of the innovation-decision design is that all this interaction, or most of it, becomes specified. It becomes interaction you can deal with because you can see it. The variables are there, rather than being mysterious. Instability is very largely just interaction with variables that you haven't included in your study. That's why these coefficients bounce around from one study to another. There are missing variables that are probably different in the different studies, but haven't even been measured. When they are all in the model, that interaction, instead of being implicit, can become explicit.

Let's turn now to the conceptualization of innovation. One of the main and very damaging inconsistencies is that some people study the time of adoption as their definition of innovation while others study the extent of commitment. The meaning of time or earliness of adoption is clear to most of us. For extent of commitment see, for example, Griliches's seminal article on diffusion of innovation. His study was of the extent to which states planted acreage of hybrid corn. In my public health study, I investigated the proportion of the resources that were going into the newer programs rather than the traditional public health programs.

These are two examples of studying extent of commitment. Well, we now think it is possible that the model we have developed is equally good for determining the time of adoption and the extent of commitment to an innovation. The parameters of the model may be different for the two; that will be very interesting to find out. But the predictor variables that I am going to talk with you about in a minute would be the same for both cases. However, the possibility of making them the same depends on doing something -- operating on time of adoption as a dependent variable. Time of adoption has suffered by being two dimensions, having two things mixed up in it. If you are interested in determining when organizations like school districts are going to adopt an innovation there are two stages to consider. First, they become aware of the innovation. Second, they decide whether or not it might do them some good. Those are two different things and each of those things demands a separate theory.

In the literature on innovation, coming to some extent from education but mostly out of the field of agriculture, there are important findings on a two-step flow of communication. Most innovations are pioneered by opinion leaders who get their information from the mass media. From there, information goes to the early adopters and from there to the later adopters, and so on, by interpersonal communication. All of this has to do with becoming aware that something exists and might do you some good. Once people are aware, they are equalized, from a theoretical point of view, in what they do after that, but you can't expect adoption, no matter who they are, before they become aware. The trouble is that there are many, many innovations where the time of awareness doesn't matter.

There are reasons for this. For example, everybody might become fully aware all at once, or everybody may have been aware of the innovation for a long time without adopting. For thirty years California has had a law permitting right turns on red lights and I think it was practically the only state in the union that did. Suddenly in the last five years, all of the other states have begun enacting a law allowing a right turn on a red light as if the idea had just surfaced. It wasn't that they didn't know about it; they knew about it all this time. But for some reason suddenly they started to adopt it. So time of awareness is of no importance there.

There are many situations in which the time of awareness makes absolutely no difference. What it means is that all of the variables that determine differences in the time of awareness are not then going to help determine differences in the time of adoption. Therefore, you have to separate the two ideas or you will experience instability from study to study in the importance of those variables.

What I'm going to talk about for the rest of the time, so far as it applies to time of adoption, will therefore have to do only with the second stage -- after awareness has taken place. The potential adopter already knows about the innovation; now, how long does it take him to adopt it and why? In that sense, at that second stage, we predict that the theory of time of adoption is similar to the theory of extent of commitment. Although there might be some differences in the relative importance of the predictor variables, the variables themselves will be the same.

There are several other kinds of problems with the conceptual definition of innovation. Thinking about them, we made what seems to us to be a fantastic discovery. We enumerated three extremely sticky problems in particular. One day we came up with a solution to one of the problems, and lo and behold it solved all three of them. We were tremendously happy, as you might well imagine -- positively elated. However, just as the innovation-decision design has met with a very good reception, this idea or solution, which we called the "fair-trial point," has met with a very bad reception. Nobody likes the fair-trial point. They all give us a hard time about it and, in particular, they say that you can't operationalize a concept like the fair-trial point. Our hidden response to that is that if anything serves conceptually in such a beautiful fashion, who cares whether you can operationalize or not! However, without going into it here, we also believe that it can be operationalized for purposes of researching this theory.

What we mean by the fair-trial point is this: There is some point at which you can be said to have given this innovation a fair trial; not that you necessarily like it, not that you are going to use it for the rest of your life, but, a point at which you know whether it will really work for you or not. You know what are its costs and benefits.

Dr. Beuke also asked the same question after reading our paper. "How would you operationalize your fair-trial point in our research on vocational education?" My answer to that was, "I would operationalize it by asking you to operationalize the fair-trial point!" In this case, he thought that was pretty fair. He knows this field of vocational education; he knows the innovation he is talking about, he knows these

people, he knows about how long the average person in the field has to work with this thing, and under what circumstances, in order to give it a fair trial. They might drop it after that but they'd know. They'd know what they were dealing with.

One of the ways that we use the concept of the fair-trial point is this: Any amount of innovation or commitment beyond that point is not innovation. Say that the fair-trial point for a certain new type of seed is 25% of your acreage. If you were a farmer and you planted 25% of your acreage to hybrid corn (go back to the 1930's and '40's for this) then every acre up to that 25% point has been more and more innovative. Beyond that, you are no longer more innovative. What this means to us is that the idea of innovation is inseparable from the idea of risk. I feel that we are only interested in the phenomenon of innovation because it has risk involved. Where there is no risk whatever, then we lose interest in trying to predict it. The other uses of the fair-trial point in theory building are also interesting and important, but I won't take the time here to go into them.

Let's return for a moment to the problem of interaction, which is solved in part but not completely by the innovation-decision design. One of the remaining causes of interaction is that the variables that have been used in the study of innovation are too situation specific. What after all is interaction? It is occurring when you have to say, "It depends. It depends on the situation." When you use variables that are at a very, very low level of abstraction or generality, very concrete in other words, they are going to be situation specific. They'll work in some cases of innovation but they won't predict well in other cases.

For example, "whether or not credit is available at the local bank" is a variable listed by Rogers. Now, you can see where that would be a very important variable in some agricultural innovations. But it is not going to help at all in determining whether or not occupational teachers are going to adopt this ISSOE curriculum and reporting system. Credit at the bank is totally irrelevant! What is the matter with that variable? Why is that not a good variable to use in a general theory of innovation? The answer is, it is too concrete -- too situation specific. Somehow we have to lift the level of abstraction, the level of generality of variables, so that they apply to almost every instance or situation we might discuss as "Innovation."

Well, George and I went through an exercise in order to do that. The exercise that we did was this. We took a variable like "credit available at the local bank" and we asked, "Why does anybody accept this to be important in predicting innovation?" In answer to that kind of question we repeatedly found variables at a higher level of abstraction. What is the reason in the above case? It has something to do with the idea that if credit is available, then you have the wherewithal to carry out the innovation. If it is not available then you don't. So, "wherewithal" seems to be a more generalizable variable than "credit at the local bank," but still keeps the same basic meaning. "Wherewithal" quickly became "resources." We felt that resources would have to be a variable included in our theory.

We looked at some of the other things. The literature indicates that the complexity of an organization is important in determining how

innovative that organization is going to be. If it has a very complex structure, it probably is not going to be very innovative. If it has a more simplified structure, it is probably more innovative. You might not think that hypothesis is any good, and it might not be, but that wasn't our worry at this point. We asked the question, "Why do people think that complexity is going to defeat innovation?" What would be the reason? Probably because it is a lot of trouble to get an innovation through a complex organization. All of these different people in different units have to review it and approve it, and so it takes time, it takes effort, it takes money. In one word, it costs. Variable after variable that we looked at, that people had used in studies of innovation, involved costs. So, cost was going to have to be one of our general categories of variables. And, as you might guess, benefits turned out to be another one.

Thus, we have a model of innovation including resources, costs, and benefits. You can read all the higher mathematics in our paper, if you want, but, the bare outlines are simply this: $I = \frac{B}{C} \times R \times D$, which means, innovation equals the benefits over the costs, times the resources, times the discounting factors. You can see that it is basically a multiplicative or interactive model. There's not an additive term in it. This means, by the way, that the computer costs in estimating the parameters would be very high.

Let me acknowledge what could be seen as a flaw in this theory. A theory like this can be considered trivial. It is in a sense a tautology. You can ask, "OK, when does innovation take place?" and

the answer is, "Well, when the benefit-costs ratio is favorable." Well, somebody can answer, "Of course! The very fact that innovation has taken place shows in itself that the benefit-cost ratio was favorable." So in that sense it's a trivial theory. But the tricky part is to specify the benefits and the costs that you have to measure that are important. That is one of the things we needed to do, because the benefits and the costs that are involved, for example, in what makes somebody turn out to vote are quite different from the benefits and costs involved in what makes somebody adopt an educational innovation.

I'd like to discuss the benefits in particular. We talk about three kinds of benefits that are important, two of which are pertinent to almost all decisions about innovation. One is programmatic benefits. Is this innovation going to help me do some job that I want done? Is it going to be instrumental in educating these kids better, or, allowing me to do it more efficiently so that life is easier for me? That's what we mean by programmatic benefits. In private industry, this involves concepts like profit in a major way. That's a factor researchers in industrial economics have used a lot. In the public sector -- in education and public health and so on -- these programmatic benefits are hard to put your finger on. We don't have the profitability yardstick here. But still, it's obvious that programmatic benefits are important to look at. But in point of fact, they are hardly ever looked at. It's scandalous that there have been so many empirical studies of innovation in which nobody is asked whether their program needs this innovation. "Do you feel that your program needs this? Do you feel that it is going to do your program any good? How much good?" They don't ask that, Why? Because it's hard

to measure. They ask, "Are you wealthy?" "Are you centralized?" and so on and so forth. But they don't ask, "How much improvement will this make in your program?" Nevertheless, that has got to be an important part of the reason for adopting and for not adopting many innovations.

The other extremely important benefit is social approval, or prestige. I have concluded in my own research, and from reading the literature, that this is a tremendously salient factor in innovation. If you consider the human being to be an animal and consider it similar to other animals, with a social structure that differs mainly in quantity but somewhat in kind, from that of chimpanzees or something like that, then innovation is a notable kind of thing. It doesn't have the same function in other animal societies as it does in the human society. One of the kinds of things that innovation can do is confer prestige. If somebody adopts something first, and does it successfully, that person is going to get attention. However, if it's a chimpanzee and he figures out a new way to peel a banana, he or she is not going to be elected president on that basis. But for reasons as yet unknown in sociobiology, human beings get a lot of status and prestige out of innovation and that has got to enter into why it's often done. And don't forget, if everybody else is doing it, and you are not doing it, you might be considered slow and backward. You lose status. You are considered left out and your best friend might say, "Look around you! It's the 20th century! Get with it!" and similar remarks.

Uncertainty plays an important part in a general theory of innovation. When the programmatic benefits are fairly certain, that is,

you can figure them out, then programmatic benefits are important. However, when there is uncertainty about programmatic benefits, the prestige coefficient will be dominant. I mean, that is when prestige becomes the much more important factor in the decision. Now I think that to a great extent, in education, the programmatic benefits are not very clear. They are quite uncertain. This would lead to the prediction that prestige is going to be a prime mover in this field and I think that may be true. With this, however, something perverse may be happening. In education, there has been so much innovation pushed on to the field for so long, and with so little of it doing demonstrable good, that a situation may have been created in which prestige is conferred for resisting innovation. There is a kind of innovation backlash! You are almost considered innovative to be conservative and resist the pressures to adopt every new thing that comes along. It's possible, anyway, that this trend goes a long way toward neutralizing the prestige that generally goes with innovation. If so, then we're back to where programmatic benefits will have to be demonstrated in order to get people to adopt new educational innovations.

Under the discounting factors, there are five of them, but I'll just mention two. One is risk. By risk, we mean that the person asks himself, "What is the probability of catastrophe if I adopt this?" If I put a new machine in this plant, is there a serious danger that my most valued employee will quit and go to work for another company? I can't stress too much that when we talk about costs and benefits here, we are not looking at this business as an economist does. We are not asking "What are the costs and benefits of this innovation?" Not at all.

We are asking "How does the adopter perceive the costs and benefits, regardless of what they are? Regardless of how irrational. Regardless of how little information he may have." This is what predicts. We do not propose to make an objective cost-benefit analysis. What we are going to do to apply this model is to ask and find out how people view the costs and benefits of adopting various innovations. This is oversimplifying it a bit, but it makes the important point. Well, the economist would try to calculate risk by means of probability distributions around benefits and costs. But, we don't feel that people think like the economist's benefit-cost distributions. People think of risk as a separate thing. They say, "Well, this innovation costs so much to do, and gives about this much in terms of benefits; but, it's an extremely risky thing for me to undertake. So, the possibility of catastrophe is an important and separate factor.

I mentioned it before, but there is also uncertainty as a related discounting factor. The true benefits and costs may be in a cloud. People could say, "The benefits or costs may range anywhere from A to X; it's extremely uncertain." Now, just as with catastrophe, adopters are not going to figure the uncertainty factor in the form of probability distributions. More likely, if the situation is quite uncertain, they'll just decide not to adopt. Or if the programmatic costs are not great but the programmatic benefits are very uncertain, they'll decide on the basis of prestige benefits.

That points out the highlights of what I've said in various papers and some thoughts that I have had since writing those papers. There is a lot more I could add if time allowed. I would prefer to stop here and let you ask me some questions.

REFERENCES

- Downs, G. and Mohr, L. "Conceptual Issues in the Study of Innovation." Administrative Science Quarterly, 1976, 21, 700-714.
- Downs, G. and Mohr, L. "Toward a Theory of Innovation," The Institute of Public Policy Studies, the University of Michigan, Ann Arbor, Michigan. 1978.
- Rogus, E. and Shoemaker, F. Communication of Innovations: A Cross Cultural Approach. (2nd Ed.). New York: Free Press, 1971.

ECONOMICS, COMMUNICATION, AND EDUCATIONAL INNOVATION

Steven J. Klees

August 1978

Work on this paper was supported by the Cornell University Institute for Occupational and Continuing Education under a contract from the New York State Department of Education. The views expressed are, of course, those of the author alone.

ECONOMICS, COMMUNICATION, AND EDUCATIONAL INNOVATION

by Steven J. Klees

In this paper I attempt to put together the implications for educational innovation issues that come out of the fields in which I have been working. My principal area of specialization is the economics of education. If you are concerned with education research and teaching, you are almost necessarily concerned with educational innovation--most research articles and mass media discussions of education topics deal with what we may think of as educational innovation issues. Innovation is also a key concept in economics, although as we will see, in many respects it is not examined adequately. More specifically, I have focussed considerable attention on new educational technologies, such as the use of radio and television for education, both in the United States and other countries. A number of the observations made here have grown out of my analysis of the literature relevant to these areas and my more practical experiences with such projects.

Most recently, I have been involved in work related to agricultural and rural development in other countries. There exists a substantial literature on the adoption of innovations, especially in the field of communications, that parallels very closely the educational innovation literature that has developed in this country. I believe that the analogies between these different bodies of literature are quite important--similar issues are being discussed and similar conclusions are being reached. By focussing on the broad, consistent trends that appear to be emerging from many different perspectives, we are able to step back and develop an overview that may permit us to formulate a better understanding of the more critical issues in the evaluation and implementation of any specific education innovation (such as the work being undertaken by the Cornell Institute for Occupational and Continuing Education, which sponsored this paper).

As I have argued in more detail elsewhere with respect to a somewhat different focus (see Ashby, Klees, Pachico, and Wells, 1978), I see what may be roughly categorized as two contrasting and competing perspectives emerging from the fields of study with which I am most familiar--education, communications, economics sociology, and educational technology. One is what I will term the dominant framework. I mean "dominant" in the sense that it is from this perspective that most people seem to look at innovations and educational issues, most researchers analyze such issues, and most decision-makers formulate educational policies. The other is what I will term the critical framework. It is "critical" in the sense that this perspective has for the most part grown from a critique which in many ways rejects the basic assumptions underlying the dominant framework. This label does not imply that the critical framework is only reactive; to the contrary, it forms a coherent alternative framework which can be used as the basis for research and policy development and analysis. Clearly by placing such a large and diverse body of thought in two categories, I am considerably oversimplifying, losing both the differences that exist within each framework and the gray area that exist between each framework. Furthermore, this brief exposition only permits me to develop a sketchy outline of each framework, without the richness and nuances that each deserves. Nonetheless, even from the schematic overview presented here I believe that we will be able to see some of the more important issues that should be addressed in the study of and policies toward education innovation.

In order to focus our discussion more precisely, there are three principal, interrelated aspects of educational innovation with which I will be concerned throughout. The first is the question of a societal evaluation of the worth of an innovation. This question forms the primary concern of the dominant framework within economics, and is gathering widespread application to all types of educational system evaluations. Cost-effectiveness and cost-benefit analysis, and the general concern with system efficiency, are all asking what is an innovation worth? Moreover, as we will discuss, most economists attempt to answer this question from the all-encompassing perspective of what value the particular innovation has for the society as a whole.

Second, we may take a more restricted view and focus on the evaluation of an innovation by particular individuals or groups. Clearly different individuals and groups may view the benefits and costs of an innovation differently. Even if it is possible to combine these various perspectives into an overall societal evaluation, as in traditional economic theory, the separate evaluations may be of interest in themselves as they will be relevant to political and distributional equity issues.

The third aspect concerns the adoption and implementation of an innovation. Adoption and implementation issues are closely related to the evaluational issues above. Whether an innovation is in practice adopted and how it is implemented will reflect a complex process through which individual and group evaluations interact with those evaluations made by the relevant decision-makers, which for the public sector is supposed to represent an adjudication of the interests of the society as a whole. Nonetheless these aspects are often analyzed separately; a proposed innovation is evaluated, then if adopted, its implementation is examined as a separate issue. In my opinion, such separation is often a mistake, both from a conceptual and practical point of view, as I will discuss in conclusion. (My basic point is that although an initial evaluation may be important, study of implementation should involve a re-evaluation, since often an implemented innovation bears little relationship to the initial concept proposed and since the competing evaluations of participants are often critical of how successfully an innovation is implemented.)

Finally, all three aspects of educational innovation introduced above involve both theoretical and methodological issues. On the theory side, there is the question of how you view an innovation; on the method side, there is the question of, once you look at it this way, how do you investigate it? Although these issues are closely interrelated, given the constraints of time and space, I will deal primarily with the theoretical/conceptual issues (see Ashby, Klees, Pachico, and Wells, 1978 and Klees and Wells, 1977 for a discussion of the methodological issues as I see them).

II. THE DOMINANT FRAMEWORK

Let me start by looking at what I call the dominant framework, and begin that examination from that field with which I am most familiar, economics. The dominant economics perspective, known more technically as neo-classical economics, is that general conception which underlies economic applications to all other fields, including education. This model is based very firmly on a view of a socio-economic system that operates according to a certain few, but required assumptions related to the predominance of private markets among which are: that for most goods and services there are many buyers and many sellers of very similar products who compete solely on the basis of price: that individuals are motivated to maximize their happiness. (which economists term utility); that firms which produce goods and services are motivated to maximize their monetary profits; and that persons participating in this market process have full knowledge of all prices, products supplied and alternative production techniques. Somewhat analogously, those activities which are undertaken by the public sector, such as education, should be directed towards maximizing the net social benefits (i.e., benefits minus costs). Economists are sometimes rather schizophrenic in using this framework; in one sense they often assume these assumptions to hold in order to accomplish their analysis, while on the other hand they realize that such assumptions may not describe the real world and thus argue for their concepts as a normative framework. That is, we should run the public sector so as to maximize net social benefits, and we should organize private production so that we have small, competing, profit maximizing firms.

Given this overall philosophical framework as to how society does or should function, a key question for economists is how an economy grows over time. Economic theory argues that a critical factor in growth is the development of new techniques by which we can produce and deliver goods and services more efficiently. Nonetheless, economists pay relatively little attention to the mechanisms by which such innovations are developed and

introduced. There is a sort of instantaneous assumption, that perceived innovations are introduced automatically by rational actors. If individual decision-makers maximize profits or net social benefits, and they have evaluated a new technique as more efficient, then of course they will adopt it. If you further assume that all individuals have perfect knowledge of all the new alternatives around them, then all relevant decision-makers would instantaneously adopt any new, successful innovation. Even if we more realistically assume that perfect information is not available, economists would expect that over time more profitable or beneficial innovations would get widespread diffusion, as knowledge of the improvement spreads.

Economists have encountered some puzzling phenomena related to potential applicability of this theory. For example, within the educational technology area, there has been considerable literature over the past fifty years which has viewed radio and television as new and improved ways of communicating with people for some purposes, and as having great potential for education. There were great expectations 20 years ago, 10 years ago, and are even today, that these innovations are going to make a startling change in education. Many economists argue that changes should take place since many studies show that these media are as effective as traditional instruction for transmitting many types of knowledge, and at the same time the costs of these media are rapidly declining in comparison to the costs of individual labor, namely teachers. All other things being equal (the ceteris paribus assumption so common to much of economic and other social science analysis), these economists expect that as the cost declines, relative to the costs of alternative means of instruction, and if effectiveness is at least maintained, new methods would be rapidly adopted and implemented. However, for the most part this has not been the case with new educational technologies.

If such economists were to look at why this is so (which they have not), they would, at least in theory, turn to an examination of the possible individual and societal benefits of the innovation in question. The dominant

economic theory framework argues that effectiveness measures are generally insufficient for understanding what is or should be done. For overall societal evaluation economists often attempt to translate educational effects to monetary benefit measures, through studying the input of particular educational programs on the earnings of their graduate (assumed by economists to measure an individual's contribution to societal productivity). To understand the different perspectives that promote or deter the adoption of an innovation, economists might argue that one should look at the benefits and costs of the innovation to different individuals and societal groups.

However, as I said above, economists have not devoted much attention to why or why not innovations are actually adopted in practice. (They do sometimes engage in social evaluation, i.e., why such innovations should be adopted according to their theory.) However, there is a large and growing literature focussed on individual and organizational change that has come primarily from psychology, sociology, and organizational theory that has had considerable application by education and communications researchers concerned with the adoption of innovations. This entire literature, in some sense, may be viewed as filling in some of the blanks in the applications of the conceptional framework of economics. The main focus of economics is analyzing why an innovation is good or not. Why innovations are actually adopted or rejected is, to the economist, a question of looking at whether or not their behavioral assumptions about individuals, firms, and the public sector hold. Most economists do not look at these questions, but other social scientists do, mostly in terms of examining the characteristics of the innovation and/or the innovators (individuals or groups).

The literature in communications research, with which I am most familiar, is in most ways quite similar to that dealing with educational innovation. As is well summarized in the works of Everett Rogers (e.g., see Rogers, 1962, and Rogers and Shoemaker, 1971), many communications researchers have looked at the success of various communications media with diffusing various types of

innovations through for example, studying the characteristics of high and low adopters (or fast and slow), and trying to discover those factors that speed and improve diffusion. Within this literature there is considerable debate over the extent to which different psychological, organizational, sociological, and sometimes economic variables impact upon adoption and diffusion in any particular case -- e.g., such factors as modernity, socio-economic status, risk preferences, education, literacy, profitability, etc.

Most recently, there appears to be a growing view among social scientists and policy-makers concerned with development that technology transfer has proceeded much slower than they had been expecting. For example, substantial expenditures since World War II have yielded very limited improvements in the agricultural technologies used in poorer countries. Such consistent findings have caused those social scientists who espouse the dominant conceptual framework discussed above to revise their approach somewhat. For example, initially many economists viewed the peasant as resistant to change, using this as a prime explanation of the slow diffusion of new agricultural technologies (the analogy to many educational researchers' view of teacher response to innovation should be clear). At worst they were viewed as lazy and tradition bound, and at best, as a satisficer (in Simon's 1957 terms) instead of as maximizer. This perspective has gradually been replaced by a view of the peasant as a rational, maximizing individual, as much so as the head of any firm, but with other goals in addition to the attainment of profits (such as the avoidance of starvation, the preservation of a particular cultural trait, etc.).

The evolving dominant conceptual framework is beginning to put more blame for the lack of adoption on the inability of centrally designed innovations to meet local needs. For example, there has been an intensive program in a region in Mexico ("Plan Puebla") since the late sixties to promote certain types of agricultural "modernization". Although adoption increased relatively rapidly for the first few years, a peak seemed to be reached quickly, and most farmers did not change their practices. Upon going out in the field, the plan's proponents found that farmers who did not act on the recommendation that corn and

beans should be planted separately, in effect said, "Nonsense, we have intercropped for years and it works well." Further study indicated that these farmers who intercropped got larger and better yields than those who followed the recommended practice. In tracing through why this situation occurred, it was eventually discovered that the recommendations are from experience based in the American Mid-West, where corn and beans are planted separately to allow tractors to go down the rows. On the small plots of land these Mexican farmers have, and given their lack of capital, they do not use tractors, thus the recommendation was quite dysfunctional, undermining the farmers' confidence in other recommendations that may or may not have been good.

These types of problems are common to all types of innovations. Thus most dominant framework social scientists have been stressing the need to avoid top down directed innovation, and to pay much more attention to the local situation, needs, and desires. This conclusion is evidenced throughout the recent studies of technology transfer (e.g., see Arndt, Dalrymple, and Ruttan, 1977, and Rogers, 1976), of the sociology of change (e.g., see Whyte, 1977), and of educational innovation (e.g., see Fullan, 1977). The need to work closely with the local users, and to begin by looking at actual local practices and their rationale, is seen as paramount to fostering any innovative change and to understanding roadblocks to adoption and implementation.

III. THE CRITICAL FRAMEWORK

Both the earlier and more recent versions of the dominant social science conceptual framework have been critiqued extensively, from many disciplinary perspectives. Much of these critiques have grown out of a concern with equity; many studies have indicated that the promotion of all types of innovation has had inequitable results, even when equity was of primary concern. In the communications literature, there is a whole area of recent study termed the "communications effects gap" (e.g., see Denohue, Tichenor, and Olien, 1975) which has found that for many innovations examined, the gains yielded are considerably greater for higher socio-economic classes than for lower classes. Although both classes may gain, the disparity between them increases as the result of the innovation. Studies of educational innovation are replicating this finding, as, for example, in some recent re-evaluations of the effects of Sesame Street (e.g. see Cook, et al., 1975).

The recent response to these findings among dominant framework social scientists has sometimes been to advocate targeting innovation specifically to those who are disadvantaged (e.g., see Rogers, 1976). In effect the idea is to withhold promotion efforts from advantaged groups and focus only on poor farmers or children from poor families. By putting your resources into efforts to help those at the bottom, the hope is that disparities will be reduced. Although often politically difficult, such a strategy may seem reasonable. However, its success depends initially on the underlying assumptions as to the social system structure; that such structures are in some ways neutral, that they allow this type of change, that the focus of policy may be directed by equitable intentions.

The critical framework literature in economics, sociology, communications, and education takes a very different view of social system structure, much of it growing out of the theories of Karl Marx and subsequent "new left" modifications and additions. As with the dominant framework, there is a central core that permeates and is common to many social science perspectives. In sociological terms, Marxist theory is based more on social conflict concepts than on structural-functional views. Instead of society as a whole (and particularly the public sector) being in some sense pursuing a neutral search for efficient alternatives, in Marxist or critical theory of society there is a struggle, and power is an important variable in analyzing that struggle, including how and to whom new ideas and techniques diffuse.

Within this framework, there is a basic conflict between those individuals and groups who have control over the productive means available (capital) and those who primarily work for wages for a livelihood. Most activities of the public sector, such as those directed towards communications and educational policies, are viewed as part of an ideological superstructure that supports the basic economic structure of our present capitalist society. The economic base produces goods and services, and the superstructure attempts primarily to insure the maintenance of this system over time. Education, for example, is seen as concerned with both production and the reproduction of the unequal structures of capitalist society over time. In terms of production, it teaches individuals the technical skills and behavior necessary for the hierarchical, extrinsically motivated organization used in modern production. In terms of reproduction, it teaches a meritocratic individualistic, competitive ideology and at the same time, teaches different skills and attitudes to different classes that result in unequal patterns of success.

Communications researchers who are critical of the adoption of innovation literature essentially view it as a mechanistic manipulation of quantified variables, without any real understanding of the structural relationships that underlie the variables being studied. The concepts used may "work" in the

sense that they will predict some innovative behaviors, but they are ideologically loaded and often reflect attitudes that Marxists would view as counter-productive to positive change. For example, modernity measures are often based on asking farmers questions like 'when you go to the marketplace, do you think people are trying to cheat you?' If a farmer does think so, he or she is categorized as having a low degree of trust, and trust is viewed as important to modernity. Alternatively, a farmer may be asked 'how is this country going to change?' The most traditional response is seen as a trust in God, a farmer scores a little higher if they say that they themselves will change the country, and the highest score is reserved for a belief that the government will take care of initiating and instituting change.

Recently, I have worked on evaluating a project in Guatemala that is delivering non-formal agricultural education to small farmers. The focus is in keeping with the recent evolution of the dominant framework--to work primarily with those farmers who are in the direst circumstances, those with only a few acres of land and who are basically producing at only a subsistence level. However, from the perspective of the critical framework discussed above, these farmers have been relegated to tiny plots of land by an historical process of unequal national and global development; in order to alleviate poverty, policies that do not deal with the question of land distribution can at best make only a very marginal contribution to the fight against poverty and starvation.

Given this perspective, how do you look at educational innovation and reform? In a book entitled The Limits of Educational Reform, Martin Carnoy and Henry Levin (1976) argue that some innovations may be implemented but, by and large, only those that do not challenge the existing distribution of power and wealth in our society and its maintenance. Such reforms may encounter local resistance for various reasons, but they are implementable.

However, anything that runs fundamentally counter to the interests of the powerful, such as greater equity of social outcomes, and true equality of opportunities, will be resisted, not in any conscious conspiracy sense, but by the systemic forces which maintain the present system.

Now from the point of view of political pragmatism, it may be that we should still pursue those innovations that will only make marginal changes in the structural status quo; however, critical theorists would emphasize that we should not delude ourselves or others into thinking we are making fundamental changes. Analysts like Carnoy and Levin conclude that educational planners, policy-makers, and researchers, if they are seriously concerned with making changes that run counter to the dominant systemic forces, must attempt to move outside the political constraints which greatly limit their focus. For example, if innovations concerning occupational education are being considered, one must include analytical and advocacy efforts that deal with those aspects of our social system that influence what types of jobs individuals get, what types of jobs are being offered, and the general forces that determine access to societal rewards. Although politically difficult to accomplish, and although there is no guarantee that such an expansion of what is presently a sectorally segmented, specialized division of policy domains, will yield a difference, the argument of critical theorists is basically that unless we try to do so we will forever butt our heads against the same fundamental problems.

IV. CONCLUSIONS

My primary conclusion, based on my exposure to these theoretical debates and their practical applications, is that social science seems to have developed two internally consistent, but basically irreconcilable, views of the world. Each view has its adherents across many fields of study, and indeed, the commonalities within each overall framework seem to be much greater than the differences that are usually used to define separate disciplines. With respect to educational innovation, each framework takes a quite different view as to what elements go into an evaluation, and how these elements are valued, and each framework also has quite different views of the forces that yield the adoption and implementation, or rejection, of any innovation.

Clearly, an important question is whether there exists some reasonably objective basis for choosing between these two frameworks in order to guide policy and evaluation with regard to any particular innovation. This question really brings us to a consideration of method: The dominant opinion in the physical and social sciences is that, given competing conceptual views of how the world works in any particular instance, we can use empirical methods to discover which theory is a more accurate reflection of reality. For many reasons, which would require considerable discussion (see Ashby, Klees, Pachico, and Wells, 1978, or Klees and Wells, 1977, for my analysis of this issue), I believe that such empirical resolution of these conflicting frameworks is impossible. Thomas Kuhn's (1970) innovative examination of the history of the evolution of thought in the physical sciences has opened up the notion that shifts in the dominant paradigm (which provides a particular overall conception that governs thought and experimentation, in any given science, at any given moment) are not caused by the rules of empirical evidence--such paradigmatic shifts result more from an array of societal forces which favor a new paradigm. According to Kuhn, a paradigm is protected from contrary empirical observations relatively easily, by forming hypotheses that are auxiliary to the core concepts, and which explain any deviating phenomena.

Of equal importance is that the methods social scientists employ to understand observed phenomena are rather imprecise. The most sophisticated regression analysis or analysis of variance techniques do not seem to be able to resolve any significant social science debates about what causes what in our social system, nor does experimentation usually offer accurate inferences to the effects of an implemented, operational system. The dominant and critical conceptual frameworks discussed in this paper have confronted each other often, with each side questioning both the reasonableness of the theoretical assumptions and conclusions of the other, as well as offering different or re-interpreted empirical evidence to support their respective positions.

Based on this line of reasoning, it therefore does not seem likely to me that we will be able to use empirical methods to select one framework as the more sensible one from which to formulate policies and research.

However, in some ways this dilemma may not have much practical importance. Based on my experience with actual educational innovations, research and evaluation analysis does not usually have a very significant impact on the educational decision-making process, especially with regard to whether or not an innovation is adopted, implemented, and sustained. By and large it seems such decisions reflect the outcome of current political forces; analysis on any issue which runs counter to the desires of the strongest forces can often be buried or countered rather easily.

Again based on my own practical experiences, I view what actually seems to determine whether or not an innovation is adopted in two ways. On the one hand, it is possible to take an individualistic perspective. For example, most educational technology projects that have been "successful" (the term usually applied to any that last) have had a relatively strong, politically powerful person pushing them. When foreign aid agencies provide the primary force supporting a project, as is often true, it is quite common to find that the innovation is abandoned as soon as that foreign support is withdrawn. This experience seems to hold true with almost any type of innovation. Thus even just to insure continuation of an innovation, the prescription (offered by both the dominant and critical frameworks) to be concerned with local needs, desires, and current practices takes on added force.

On the other hand, it is easy to view whether or not an innovation is adopted from a less individualistic and more systemic perspective. For example, the growing global push for educational and communications use of satellites (given high level global support in this country through Henry Kissinger when he was Secretary of State) seems to reflect

more than the cost-effectiveness of a new delivery system. There are high level political forces and large multinational firms that have a strong stake in the future of satellites. Such system wide forces can be seen to play some part in virtually any resource allocation decisions, especially those concerning innovative techniques.

It is interesting to note that above I began this foray into my practical experience, as to why innovations are adopted, by suggesting that analysis may not make a difference in this decision. However, the two views generated by my practical experience correspond quite closely with each of the two overall analytical perspectives reviewed in this paper. Thus social science analysis, although perhaps not being used as the basis for decisions, may be quite useful in examining how these decisions are actually arrived at. Again, however, the relatively individualistic perspective of the dominant paradigm and the more systemic perspective of the critical paradigm are relatively difficult to reconcile with each other, although surely both forces are operating (as each paradigm explicitly recognizes, but the question of emphasis effectively divides them).

Now despite my cautions that I have rarely seen social science analysis used as a decisive factor in whether or not to adopt an innovation, I have seen it have substantial impact on how an innovation is implemented and operated. In my opinion this is mostly because the strongest political pressures are massed behind adoption questions, and sometimes with sustaining an adopted innovation, but much less forcefully with in what form any particular innovation is sustained. Analysis of system implementation is often completely divorced from overall system evaluation. For example, from a rather technocratic perspective, it is often felt that an innovation that was decided upon as worthwhile (by some political and evaluative process) should be implemented as smoothly as possible, retaining its original conception

as much as possible. Thus analysis of implementation often is focussed on ensuring smooth and rapid adoption. Basically I believe that this separation of implementation analysis from evaluational analysis is an impossible view to hold—not necessarily in any moralistic sense, but from the practical view that when you implement any innovation you encounter all sorts of obstacles. These obstacles, in the form of different local motives, ideas, circumstances, etc., generally make the adopted innovation quite different than the planned innovation. In practice what you find is that the fully implemented innovations are often essentially different from the evaluated initial conception (or experiment). If you are concerned with whether the innovation is in any sense socially valuable (or valuable to particular individuals or groups), it seems necessary that a study of implementation include an evaluational component. However, of course this brings us back to the question of from which framework one makes evaluative decisions.

As concrete examples of these issues, one has only to look at any of the feedback mechanisms which accompany most educational innovations. Analysis of system feedback is often able to re-direct and fine tune various features of an innovation. However, for the most part such feedback is analyzed from the perspective of the dominant framework that has instituted the innovation and provides its direction. For example, it is rare for these feedback mechanisms (or the initial evaluation) to really investigate local needs and desires (except through a rather cursory and often self-fulfilling type of "needs assessment" which is currently in vogue), as argued for from both frameworks posited. Moreover, it is even rarer that such evaluational efforts follow the advice of such analysts as Carnoy and Levin to move outside their relatively narrow domains to investigate the linkages to other aspects of our social system that may determine the real success of the innovation.

Finally, in addition to the points above, I believe that there are two major conclusions that come out of the analysis presented in this paper, providing we assume that decision makers are motivated to evaluate the worth of adoption and implementation of an innovation. First, if one is willing to make an ideological commitment to one of the over-riding frameworks I have described (as I argued above, I believe it is impossible to make this commitment on an empirical basis), it would seem to be worthwhile to form a multi-disciplinary evaluational effort. Although this is often talked about it is rarely done--as I have argued in more detail elsewhere (again see Ashby, Klees, Pachico, and Wells, 1978), within each framework different social science perspectives flesh out the gaps in each other. Such diverse fields as economics, sociology, psychology, communications, and education have strong conceptual commonalities (within either framework) that taken together can yield a more innovative and insightful evaluation of any particular innovation.

Second, if decision makers wish to avoid making an a priori ideological commitment to a particular overall framework, it seems reasonable that they undertake competing evaluations of an innovation. As should be clear by now, in my opinion such is not satisfied by multi-disciplinary research, which can be undertaken within either framework posited. This recommendation would mean devoting some additional resources to the evaluational process, although probably not as much as one would expect, since competing evaluators could jointly be required to decide upon and gather a common empirical base on which to develop their evaluations. Such a policy has been suggested elsewhere for similar reasons (e.g. see Cohen and Garet, 1975) and rests most fundamentally on the assumption that it is impossible to prove one perspective to be true. In this case, to ensure the legitimacy of the public sector decision making process, it would seem incumbent on decision makers to at least attempt to look at an innovation from very different perspectives, and perhaps even to put contrary evaluations and recommendations before a larger forum of the public to be discussed, debated, and decided upon.

REFERENCES

- Ashby, J., Klees, S., Pachico, D., and Wells, S. The economics of education and communications system strategies for agricultural development. Washington, D.C.: U.S. Agency for International Development, 1978.
- Arndt, T.M., Dalrymple, D.G., and Ruttan, V.W. (Eds.) Resource allocation and productivity in national and international research. Minneapolis: University of Minnesota Press, 1977.
- Carnoy, M. and Levin, H.M. (Eds.) The limits of educational reform. New York: David McKay, 1976.
- Cohen, D. and Garet, M. Reforming educational policy with applied social science research. Harvard Educational Review, 1975, 45, 17-43.
- Cook, T.D., et al. "Sesame Street" Revisited. New York: Russell Sage Foundation, 1975.
- Donohue, G.A., Tichenor, T.J., and Olien, C.N. Mass media and the knowledge gap: A hypothesis reconsidered. Communications Research, 1975 (January), 2, 1, 3-23.
- Fullan, M. Research on curriculum and instruction implementation. Review of Educational Research, 1977, 47, 1, 335-97.
- Klees, S. and Wells, S. Cost-effectiveness and cost-benefit analysis for educational planning and evaluation. Washington, D.C.: U.S. Agency for International Development, 1977.
- Kuhn, T. The structure of scientific revolutions. Chicago: University of Chicago Press, 1970.
- Rogers, E.M. (Ed.) Communications and development. Beverly Hills: Sage Publications, 1976.
- Rogers, E.M. Diffusion of innovations. New York: Free Press of Glencoe, 1962.
- Rogers, E.M. with Shoemaker, F. Communication of innovations. New York: The Free Press, 1971.

Simon, H. Administrative Behavior: A Study of Decision Making Processes in Administrative Organization. New York: McMillan, 1957.

Whyte, W.F. Toward a new strategy for research and development agriculture: Helping small farmers in developing countries. Desarollo Rural en Pas Americas, 1977, 9, 1/2, 51-61.

TWO PERSPECTIVES ON INTERVENTION
FOR SCHOOL IMPROVEMENT

John E. Bowers

May 1978

Opinions and interpretations expressed in this paper are the writer's and no official position or policy of Research for Better Schools should be inferred.

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION.	73
TWO PARADIGMS FOR STUDYING THE INSTRUCTION- LEARNING PROCESS.	75
Process-Product Paradigm	75
Process-Process Paradigm	76
THE EXEMPLARY PROGRAM MODEL	78
The Intervention	82
The Context of Implementation	83
The Implementation Process	84
Implementation Outcomes	85
Summary of the Exemplary Program Approach	85
THE INTERACTION PERSPECTIVE	86
The Intervention	88
The District Context	93
The Implementation Process	94
Implementation Outcomes	97
Summary of the Interaction Perspective	100
REFERENCES	104

TWO PERSPECTIVES ON INTERVENTION FOR SCHOOL IMPROVEMENT

INTRODUCTION

In developing two contrasting perspectives for improving schools through intervention, I shall start with some brief working definitions. School improvement means better student performance. Although schools perform other functions than instruction--such as certification, selection, custodial care, socialization, and self-maintenance--our attention is on instruction. An intervention is an educational product developed outside the school plus technical assistance for its implementation within a school. An intervention may be a curriculum program, an activity, a practice, or a process; but since we focus on instruction and student performance, we shall be considering mainly the implementation of interventions that are instructional programs. Instructional programs are customarily described in terms of components such as objectives, staff structures and roles, target populations, materials, facility and equipment requirements, and instructional methods. Technical assistance refers to the materials and expertise provided by an intervention agency to a school organization during its implementation of an intervention. And the implementation period is the total span of time during which an implementation relationship exists between a school organization and an intervention agency.

The first perspective can be called an "exemplary program" model for school improvement. This straight-forward approach identifies educationally effective programs, develops packages that describe their components and procedures for implementing them, and disseminates these packages to school districts for implementation. The second perspective is an "interaction" model. This is really more of a framework for studying the implementation process than it is a particular model for implementation. Its description represents my interpretation of the conceptual work of Beth Hanna (1978) of Research for Better Schools. She has brought a sociological point of view to the study of implementation that gives us a potentially powerful basis for examining the process whereby a school district and an external intervention agency collaborate on an improvement effort.

Discussion of the two perspectives will be organized in terms of how each treats an intervention, the context of implementation, the implementation process, and the outcomes of that process. The exemplary program model is discussed first; doing so sets the stage for the interaction perspective. While the conceptual superiority of the interaction perspective is a theme of this presentation, I do wish to emphasize that whatever superiority it may have exists because of sincere and dedicated attempts to field test the exemplary program model. Without these

attempts, we should not be in a position to suggest how to examine the complexity of the implementation process. Hindsight criticism is easy, and it is easier still to forget the extent to which a more complex view of implementation has depended upon the work of those who have tested the exemplary program approach to school improvement.

TWO PARADIGMS FOR STUDYING THE INSTRUCTION-LEARNING PROCESS

Since student performance is a primary concern of intervention in this discussion, it is important to consider how we view the nature of the instruction-learning process. Walter Doyle (1976) has distinguished two fundamentally different paradigms for studying the relationship between instructional variables and student achievement. Although he does not specifically relate this distinction to our two perspectives, they are appropriate for doing so, and I should like to introduce them.

Process-product paradigm. Doyle believes that the process-product paradigm underlies most ways in which the relationship between instruction and learning has been studied. So-called input-output analysis combines variables related to the quality, amount, and management of instruction together with measures of student background characteristics as independent variables in regression equations predicting student

performance. In other words, the instructional process determines an educational product. There is no question that many researchers have identified predictively valid instructional variables describing students entry characteristics, teacher behaviors, and instruction (e.g., Bloom, 1976; Carroll, 1963; Centra and Potter, 1977; Connolly and McGrail, 1978; Cooley and Leinhardt, 1975; and Rosenshine, 1976). As Doyle points out however, predictive validity does not tell us why an instructional variable is effective. And we cannot begin to understand why without developing some conception of the learning process.

Process-process paradigm. A process-process paradigm views the learner as the critical determiner of achievement. Instructional conditions do not control how the student performs; instead, they support the activation of learning processes "inside the head" of the student that influence what is learned. The student actively mediates instruction; his covert cognitive operations and outcomes intervene between instruction and performance.

One's view of how to improve student performance depends upon which paradigm underlies the design of instructional programs. A process-product paradigm leads to the selection or development of a "Treatment X" anticipated to "cause" better student performance related

to intended objectives. This paradigm seems to be the unrecognized basis for the exemplary program model of intervention, which identifies programs-as-a-whole that are expected to serve as models for improving student achievement.

The curriculum designer operating under the process-process paradigm sets cognitive as well as performance objectives in line with explicit hypotheses regarding cognitive processes and outcomes; in particular, how factors influencing cognitive processes are designed into the conditions of instruction, how different cognitive processes influence different types of learning, and how retrieval factors are designed into the conditions of performance measurement so that different types of learning can be evaluated. Under this paradigm, student entry characteristics are existing cognitive states brought to the instructional situation which actively influence new learning. The literature of cognitive psychology is now developing models for internal learning processes and outcomes that may help clarify why certain kinds of instructional variables are effective (Egan and Greeno, 1973; Mayer, 1975; Mayer, 1977). Anderson (1970), for example, presents an excellent discussion of attention as a mediating process by which learners translate nominal stimuli in the instructional situation into effective stimuli. Kulhavy (1977) has also discussed feedback influences on learning. The cognitive

approach also permits the integration of learning and motivation to the extent that internal processes and structures represent expectancies, needs, goal-direction, and interests that affect a student's level of effort and persistence in achievement-related situations (Weiner, 1976).

Now we shall consider the exemplary program and interaction perspectives. As mentioned earlier, each will be treated in terms of its view of the intervention, the context of implementation, the implementation process, and the outcomes of the implementation process.

THE EXEMPLARY PROGRAM MODEL

In the late 1960's, the need arose to evaluate the effects of government program effort in compensatory education. Presumably congress and others required assurance that this huge investment had educational value. The way to demonstrate educational value was to show that students enrolled in compensatory programs performed better than they might otherwise, other things being equal. Although this last statement ignores many other effects of this federal effort, it does imply the need for summative evaluation design to contrast program student's achievement with that of a comparison group's. It also implies that effective programs are those that show significant contrasts favoring program students. The term "exemplary program" entered the language of

federally-sponsored compensatory program evaluation at this time, attached to programs that were shown to be effective. Exemplary programs were those accomplishing the job of improving student performance; they could be pointed to with pride and serve as examples of good things that happen when federal money is effectively used at the local level for program development.

In order to locate exemplary programs, the government contracted with R&D agencies to search for exemplary programs and to prepare brief descriptions of them that could be distributed to practitioners at the local level. The American Institutes for Research subsequently conducted a series of searches for exemplary programs in compensatory education. Since these searches set the pattern for later ones, and this pattern set the stage for the development of the exemplary program intervention model, it is worth briefly noting procedures that guided the identification of exemplary programs. First, the population of candidate programs was determined and general criteria set for labelling programs as exemplary. Information related to these criteria was contained in local program evaluations, so, the contractor secured as much of this information as possible. Given the poor quality of local evaluations, initial screening eliminated from consideration the majority of programs who obviously did not meet criteria. Then increasingly tighter screens were set in

order to sift information for survivors. Those passing the final screen were those whose evaluation evidence showed that they were effective, and that their effectiveness was a result of the program. These were but a tiny fraction of the initial candidates. These exemplary programs were then examined in depth and descriptions of each prepared for the series titled "It Works."

Two points should be noted. The first is that exemplary programs were those with exemplary evaluation; there were undoubtedly many programs screened out as false negatives because of deficiencies in their evaluation designs. The second point is that the "It Works" series only described the nominal features of the programs. Since the "meta-evaluation" process was not organized to identify which program characteristics affected student performance, all that we can conclude with reasonable certainty is that each program-as-a-whole "worked."

This search-and-describe pattern was expanded in the 1970's when the exemplary program became a basis for developing an intervention model. Two things happened. Detailed program descriptions together with guides for their implementation were created (called program implementation packages [PIP's]). The PIP's were very carefully thought out. The basic assumption of the PIP's was that if a local site followed the prescribed steps in the implementation process so that a

faithful "copy" of the exemplary program model was achieved, then students in the implemented program would show the same exemplary performance outcomes as did the students in the model program. I can recall very clearly the strength of this belief stated in the form,

"...one can pour water over a PIP and an effective program will grow!"

For anyone interested in the PIP's, I recommend Stearns' (1977) evaluation of the field test of the six original PIP's.

The second point was that the concept of an exemplary program dissemination model became legitimated in late 1973 with the creation of the Dissemination Review Panel in the Office of Education. The panel's job was to certify whether screened programs submitted to it as exemplary truly were. Information about only those which passed could be packaged in one form or another and disseminated with federal funds. In one sense, this strict quality control was good; it imposed a policy demanding the soundest evidence about program effectiveness. Anyone who has submitted programs to the panel comes away with strong respect for its ability to cross-examine the weakest point in data put forward to demonstrate a program's exemplary status. Shaky evidence regarding treatment-control comparisons, characteristics of performance tests, the extent of program attrition, and cost-effectiveness was virtually certain to be detected during panel review. The panel's judgments

operated as further contracts were awarded to locate and package *exemplary programs for Right-to-Read, for bilingual education, and for ESEA Title I.*

There is no quarrel with insistence upon sound summative evaluation evidence as a basis for declaring a program to be exemplary. And there is little doubt the exemplary programs are effective. But summative evaluation makes sense only when a program is "in place." The problem for implementation is to put a program in place, and requires a much greater emphasis on evaluating the determinants of the implementation process. Implementers, who are intimately familiar with the unique features of their school district, know that maintaining the identity of a model program during implementation depends upon the characteristics of their districts. I cannot believe that district staff are seriously impressed either by the notion that a totally faithful program replicate is possible, or that if it were, exemplary program effects can be expected. The best we can say is that if you try to copy a program, it is probably better to copy an effective one.

The intervention. The intervention consists of an exemplary program description and materials to guide the implementation of its components. The program-as-a-whole is demonstrably effective, but why it is and

which components make it effective are unknown. Relationships between program components and student performance are not understood. This would not be a serious problem if total programs could be easily copied; but there is little evidence that suggests this is true (Fullan and Pomfret, 1977). Early pilot testing of the PIP's showed the need for more detailed replication guides, and more were created. In other words, the exemplary model approach remained intact and did not shift toward de-emphasizing the fidelity perspective. One assumes that more and more implementation guidance materials accumulate as the number of attempted replications of a program increase. The implementation strategy of this model for intervention is almost a classic example of the process-product paradigm carried over into the school improvement process.

The context of implementation. School districts are treated in the exemplary program model as replication sites; there is really no other way that they can be viewed. An exemplary program represents an n of one; all that is certain is that a particular exemplary program was effective in a specific location. How this program's operating characteristics would be influenced by the features of another setting cannot be estimated. Although descriptions of certain nominal features of the exemplary program setting are included in packaged descriptions, these

enable only the loosest type of generalization regarding implementation of the program model in a new location. Fullan and Pomfret (1977), in their review of several implementation studies, stress the importance of context influences, and how context dimensions such as materials, structures, roles, knowledge, and values change during the implementation process. The exemplary program model does not address the question of how these kinds of adaptive change are to take place in order to insure the implementation of a faithful copy of an exemplary program.

The implementation process. Fidelity is the key descriptor of the implementation process in the exemplary program model. The district is not seen as needing to adapt the intervention by altering its components to fit the local district context. The program-as-a-whole is literally considered to be the determiner of student performance. Quite simply, PIP's are "how-to-do-it" packages; the intervention controls the implementation process. There is no basis for estimating district context effects on the program or for estimating program by learner interactions. If these effects operate, the implementer needs a basis for estimating the relationships among district context features, program components and student outcomes in order to make decisions regarding how to adjust the implementation environment or the program to achieve better student

performance. Even should the program be copied with fidelity, what does the implementer do when student performance does not change as expected? There's no clear rationale then for deciding which program components to modify.

Implementation outcomes. Implementation outcomes are of two kinds. First, an index of fidelity is presumably needed so that an evaluator has confidence that a program has been implemented as intended. In reality, however, student performance is the critical criterion measure of school improvement, for no one will argue against the idea that an implementation is "successful" when an implemented program results in significantly better student performance. This presents a bit of a quandary. Fidelity is necessary for successful program implementation, but not sufficient for guaranteeing improved student performance; improved student performance is necessary and sufficient (at least in the mind of the implementer) for successful implementation. This is very puzzling. It does reveal however, that fidelity is apt to be of far greater concern to the intervention agent than it is to the implementing school district.

Summary of the exemplary program approach. There are several characteristics of the exemplary program model of intervention for school improvement that limit its application in the real world of school

districts. The intervention is a "black box;" the influence of context features of the implementing district are not seriously addressed in the design of the implementation package; the implementation process is indexed in terms of process fidelity and its "success" evaluated on the basis of improved student performance.

If we want to improve student performance, then we need more than a fidelity model for implementing "black boxes." We need a conception of implementation that incorporates ideas of how instructional variables affect learning outcomes; how instructional delivery is affected by district characteristics; and how these same district characteristics affect the relationship of the implementing district and the intervention agency. This leads us to the interaction model of intervention to improve schools.

THE INTERACTION PERSPECTIVE

The interaction perspective should properly be regarded as a working framework for the examination of the implementation process. At this stage in its development, it is largely theoretical and has none of the aura of "certainty" that perhaps characterizes the exemplary program model. As a framework, its value perhaps lies more in the fact that it represents a perspective for asking questions than for

providing definitive answers, and calls for research to answer the questions "... What happens to an intervention during implementation? ... How can we describe the implementation process? ... Who controls the process? ... How do we assess the outcomes of implementation?" These are far more complex questions than those arising from the exemplary program perspective, which asks "... Is the intervention copied? ... Does it work?"

In discussing the interaction model, I shall refer to a project that Beth Hanna and I are working on that has studied the implementation of five training products developed by Research for Better Schools to assist school district committees in arriving at better decisions related to curriculum needs assessment, program selection and modification, and program evaluation. Clearly, these types of intervention are not instructional programs as we have been discussing them since their primary impact is at the district planning level. But their use is intended to affect student achievement, and their development was a direct result of RBS's early work in implementing individualized instructional programs, which often encountered difficulties arising from districts' inability to clarify objectives, identify curriculum needs, select or alter curriculum programs to meet needs, and evaluate the effects of curriculum programs.

As proposed, the study had two objectives. The first was to evaluate the effectiveness of these products for improving district decision-making practices. The second was to identify problems associated with the use of the training products. In reality, however, project objectives shifted during the course of the project. The project abandoned an exemplary program, or in this case an "exemplary practice" approach and began to develop the interaction perspective. We needed to consider how districts influence the implementation process and to address the nature of the relationship between ourselves as intervention agent and the school districts. In moving from the exemplary model, with its intervention emphasis, we began to see the implementing school district as a pivotal system that must develop new external linkages with the intervention agency as well as new internal linkages with the classroom when instructional interventions of the type discussed under the exemplary program model are implemented.

The intervention. The intervention within each school district in the study nominally consisted of a training product plus technical assistance for its use. There were five training products: these were Planning Curriculum Improvement; Selecting a Curriculum Program; Evaluating a Curriculum Program; Surveying the Community; and Pupil-Perceived

Needs Assessment. Each product consisted of a sequence of prescribed tasks to be accomplished by a district committee to arrive at "better" decisions--such as a better evaluation plan than that which they might develop under existing procedures. During the products' development, decisions about content were based on formative evaluation results obtained for a small number of pilot sites. Thus, the content of the products incorporated many of RBS' assumed prescriptions for how a specific curriculum improvement effort should be carried out by districts in order to arrive at good decisions. The study was intended to validate the effectiveness of their use in natural settings.

I should point out here that district participation in the study involved three stages of contact between RBS and the districts. First, districts were made aware of the project through public notice, personal contact, and the help of intermediate state agencies. RBS staff met with each interested district to explore needs and interests, to review the products and requirements for their use, and to select one for use. Second, a coordinator chosen by the district to lead the committee effort was trained by RBS in the use of a selected product. Third, an RBS monitor attended meetings of the committee when the product was actually used. Thus, participation involved what Temkin (1978) refers to as mobilization and utilization stages; RBS capitalized upon

important mobilization phase factors such as local motivation to change, incentives to change, district participation in the improvement process, and the capacity of the district for change.

Committees using the intervention products typically consisted of experienced administrators and teachers; a few included students and parents. Curriculum areas included reading, writing, citizenship education, mathematics, affective education, art, career education, language arts, foreign languages, and social studies. Other areas included education of the gifted, general education for potential drop-outs, extra-curricular programs, and district-wide goal-setting.

This project began with an intervention-focus every bit as strong as that characterizing the exemplary program model. There was the belief that if districts followed prescribed tasks, then their curriculum decisions would improve. In fact, we devoted considerable energy in planning how to aggregate evidence of product effectiveness across school districts for submission to the Dissemination Review Panel. We deliberately downplayed the intended role of technical assistance so that evidence of product effectiveness would not be seriously contaminated. Monitors were initially instructed to provide help to district committees only to the extent necessary to insure that they accomplished the prescribed tasks of the products. Keeping the committees working with

fidelity to the prescribed tasks was the intention.

When district committees began using products, we discarded the fidelity perspective. RBS monitors found users motivated by needs neither obvious nor altogether product-related. Some committees resisted adherence to prescribed tasks, or added new ones for other objectives. Some committee members had no clear idea of what they were supposed to do. Hidden agendas were revealed. Power struggles were detected. Some committee coordinators were using the process for personal status needs. At times, the monitors had to play roles prescribed for district staff members. In many respects, the difference between how we intended the products to be used and how the districts actually were using them pointed to conflict over the "ownership" of the intervention. Was it ours or theirs?

How then is an intervention characterized when it loses its intended identity and is changed by an implementing district? And why do they change it? How were we to adjust to these changes? We could provide no strong incentives for "proper" use, and we had little inclination to end relationships with districts whose committees failed to follow product prescriptions that we considered necessary for their improvement. In order to answer these types of questions, Beth Hanna began to develop a basis for explaining why these seemingly simple products led to such

variable response patterns in the districts. In order to understand what was happening, she was led to examine the intervention and how it affects the district, how to describe the implementation process, and how the interaction of the intervention and the district affect the process.

She saw that use of these products exerted unfamiliar demands, since prescribed tasks often departed from customary practice. I am not referring simply to demands on the committee members. During the stages of implementation, pressures were being exerted on the roles, norms, technology, task structures, and resources of the district itself. An intervention may cause problems for the implementing district at various levels of its organization.

The district also had to establish an external relationship with the intervention agency. The nature of this relationship was seen to affect the form of the intervention and the nature of the implementation process. This relationship was one between two organizational systems. The intervention was not simply products and technical assistance. Its represented RBS' assumptions about the nature of school district systems and how they could be improved. The intervention reflects an RBS technology for improvement; roles for its agents who were to carry this technology into districts; resources committed to the effort such as expertise, time, and materials; and activities carried out to introduce the technology to

the district during the three process stages. The organizational system of the intervention agent confronted the organizational system of the district. And we have seen that this confrontation could be disruptive depending on the extent to which the needs and demands of the district interfered with its compliance with the prescribed tasks of the intervention.

The district context. Districts could not be considered replication sites. In fact, the notion of a constant replicable intervention went by the boards. Since districts were controlling the shape of the intended intervention and the nature of the implementation process in varying degrees, how should we characterize districts? Certainly not as passive recipients of interventions designed for their own good. Analogous to the active learner in the instructional situation, the district is an active social system in the implementation situation. Districts are describable in terms of organizational properties developed around past and current activities related to the use of the intervention. In a sense, these past and current activity structures are analogous to the prior learning of an individual student.

District use of the intervention was viewed as depending upon the extent to which past and current structures influenced its active response to the problems encountered during the implementation of the intervention. Furthermore, these past and current structures could either help or

hinder the accomplishment of prescribed objectives, since they determined the ability of the district to provide necessary organizational supports to implement the intervention.

The kinds of organizational support characteristics that we are discussing are typically absent in "school effects" research. We attempted to examine district organizational characteristics such as complexity; resources; goals; level of technology; and authority, norm, and task structures. These were believed to be important dimensions brought into play when districts are called upon to allocate needed support, determine new role specifications, and adjust existing structures in order to deal with the intervention. These are the kinds of organizational dimensions Baldrige (1974) believes have been overlooked in the study of innovation. He argues that the organizational factors of the school district influence "...the amount, the rate, and the permanence of innovation." These organizational dimensions influence the extent to which district objectives for using the intervention either comply or conflict with prescribed objectives.

The implementation process. The implementation process was far more complex than we had originally conceived. Implementation success was no longer simply a matter of task compliance. Districts were adding new

non-prescribed tasks during the process of implementation; these were tasks introduced on their own initiative, or tasks needed to cope with problems arising from use of the intervention. These non-prescribed tasks could reflect district objectives for use of the intervention and they could also reflect organizational adjustments to the problems created by the intervention. Furthermore, these non-prescribed tasks could have as their objectives either changes in the district or changes in the intervention.

The relationship between the district and the intervention system is the basis for characterizing the implementation process. This relationship involves locus of control in either system and adjustment in either party in order to carry out the implementation objectives of both. Locus of control is never totally in the hands of either system; instead, control of the relationship is a function of the mix of prescribed and non-prescribed tasks carried out and the extent to which either party adjusts itself to accommodate the needs, demands, and task objectives of the other. Different types of relationships will emerge as an intervention is implemented across several school districts. There is no single model that describes the entire set of relationships. We should therefore not expect any "pure" model, such as the fidelity or exemplary program model, to accurately describe what happens during implementation, except in some instances.

The interaction model dimensionalizes the implementation process in terms of shared locus of control, a mix of prescribed and non-prescribed tasks, objectives, and adjustments made or not by the intervention and district organizations. When locus of control is the intervention agency's and all tasks are prescribed and require district adjustment to the demands of the intervention, we have the exemplary program model. A district will co-opt the implementation process to the extent that it seizes initial control from the intervention agency, substitutes its own tasks and objectives, and adjusts itself in ways that serve only its needs using the intervention as a vehicle for doing so. An example might be a district which participates in an evaluation planning effort in which it has no interest other than to groom the committee coordinator for a planned promotion. A stalemate would be expected when locus of control was shared but each party struggled without adjustment to impose its task objectives on the other. The interaction model is a framework for analyzing the implementation process as a function of the relationship between two organizational systems which may facilitate the objectives of either party or not. It is a perspective for analyzing the process; and it is not a type of intervention strategy. In fact, it argues vigorously against the idea of developing any typology of intervention models.

The implementation of the training products in the RBS project

led to a primary concern with the external relationship between an intervention agency and a school district. When the intervention represents an instructional program, however, then we would presume that internal organization change must occur as well, and would need to be separately examined at the school and classroom levels where instruction takes place. Students, teachers, principals, and central district staff would all be affected by a "disturbing" instructional intervention; and all levels would need to respond in unfamiliar ways to the problems it presents. All also belong to social groups with existing activities, structures, and norms; students and teachers form peer and classroom groups; and teachers and principals form school building groups. It is reasonable to speculate that an intervention designed to improve student learning requires adjustments in the existing activities, structures, and norms within each of these nested organizational levels. I only wish to point out just how complex the context effects might be during a curriculum program's implementation, if we can legitimately extrapolate from our experience in this study.

Implementation outcomes. Outcomes from the interaction perspective are district-focussed as well as intervention-focussed. We attempted to measure different types of district change as a result of the implementation process.

- Continuation activities. These are responses by the district to specific committee outcomes, such as a committee's evaluation plan for the third-grade language arts program. Actually executing the evaluation plan would represent a continuation activity. Continuation activities varied in intensity from simply reviewing a committee's outcome to institutionalizing the specific committee outcome.
- Transfer activities. These are responses by the district that are related to the process underlying the use of a product by a committee. As an example, a district might review a committee's decision to select a particular textbook for its third-grade language arts program, and then decide to use the same type of selection product for choosing a mathematics textbook for its fifth grade.
- Adoption activities. Adoption activities represent more than a district's "buying" either a specific committee decision or a product's process. In this case, the district actively reorganizes itself to internalize the approach represented by a training product. For example, one district that I monitored decided to internalize the process for planning program evaluations so that all curriculum evaluations would be planned in the way that their committee developed an evaluation plan for the gifted.
- Scope of change. This reflects the breadth of change activities. Change may affect only the immediate committee members, or it can extend to other staff, other levels, the entire district, or to groups external to the district. Scope of change is also a function of the number of classrooms, grade levels, and schools affected by a change activity. In one instance, a federal monitor was so personally impressed by an evaluation plan developed within a district that he arranged for that district to present a workshop demonstrating how the plan was developed to project directors in a dozen other districts.
- Type of change. This reflects the kinds of district organizational structures affected by its use of a training product. Types of change were classified as social or psychological, cultural, programmatic, or organizational. To illustrate, a social or psychological type of change might be simple endorsement of a committee

outcome. A cultural type of change affects district goals, policies, knowledge base, rules, and procedures. Programmatic change affects curriculum content, materials, equipment and facilities. Changes in organizational structure are those that affect roles, authority structures, communication patterns, resources, and decision-making structures.

We are only beginning to explore the relationships between implementation process measures and outcomes. Beth's analysis of the project information has mainly involved case studies to develop working hypotheses for guiding our future implementation projects. We shall have to bootstrap our way toward a more quantitative analysis of the interaction model.

We might speculate however, that intervention locus of control with largely district adjustment during the implementation process would result in limited change. Committee members would learn the process under very controlled conditions; consequently, we might expect continuation activities to be carried out of small scope. To the extent that districts share locus of control, and are able to introduce their own task objectives to increase their capacity to perform prescribed tasks, we might expect more transfer activities to result, since the districts have invested effort into the process. In other words, the district which adds on to the prescribed tasks is actively engaging in and not passively following its rules for improvement. A large amount of active support

would seem to favor adoption that could extend throughout other organizational levels of the district. To the extent that mutual adaptation occurs, this could encourage adoption since the districts actually use the intervention more easily.

Outcomes may also be negative from the intervention agency's point of view. Co-optation of the process by the district would discourage continuation activities. Perhaps features of the intervention would be transferred or adopted, but probably not the product usage prescriptions intended by the intervention agency.

Summary of the interaction model. Bear in mind that the interaction model discussed here is only a start toward building a model of intervention for school improvement. It builds upon the exemplary program model in several significant ways. Both the intervention agency and the school district are viewed as social organizations. The intervention is not a "black box." It is a combination of technology, agents, resources, activities, and goals designed by the intervention system according to how it conceives of the improvement process. District organizational properties such as goals, resources, authority and task structures, and complexity are critical determiners of what happens when a district organization attempts to implement an intervention.

Implementation requires a relationship to be established between the intervention agency and the school district. This relationship may have positive or negative impact on outcomes, depending upon the adaptation of both systems. We have described this relationship in terms of shared tasks, locus of control, and mutual adaptation. Different combinations of control and adjustment lead to different patterns of interactive relationships.

The interaction model was developed on the basis of a study focussing on the external relationship between the district and the intervention agency, so we can only speculate about the internal changes that need to occur within a district when it attempts to implement an instructional intervention rather than one whose purpose is staff training. Implementing a curriculum program that directly impacts students leads us to suggest, however, that adaptation must occur within the district, school building, and classroom levels during the implementation process. As these organizational levels are more proximate to the individual student, we need to consider the relationship between instruction and learning. A model for school improvement should assume that instructional interventions be designed to activate and support cognitive processes that lead to desired learning structures that can be evaluated on the basis of performance measures (Bowers, 1978). This is a far cry from "black

box" packages that enable us to say only that "Program X is better than Program Y." We need to incorporate into the model some conception of the dimensions characterizing instruction that influence cognitive processes and outcomes. As Mayer (1977) points out, "Relying on magic formulas like 'Method A is best' is not enough--an understanding of how instructional manipulations affect internal processes can aid in determining which method to use, under what circumstances, and for whom" (p. 74).

At the classroom level, a school improvement model needs to incorporate group processes and structures found there. Doyle has pointed out the extent to which the classroom setting is informationally ambiguous to the student. Students typically do not know what is expected, and the behavior of teachers does not provide students with reliable reinforcement signals that what they are doing is what is expected. Students cope in this group situation, often ineffectively. Understanding characteristics of the classroom is important for understanding how an instructional intervention is implemented in the classroom.

At the school and district level, we need to better understand how organizational characteristics affect the delivery of better instruction. Our discussion has stressed the need to treat the district as an active social system and how the system affects the identity of a seemingly

simple intervention and the implementation process. An instructional intervention is presumed to impact all of the levels within a district as it finds its way to implementation in the classroom.

REFERENCES

- Anderson, R. C. The control of student mediating processes during verbal learning and instruction. Review of Educational Research, 1970, 40, 349-370.
- Baldrige, J. V. The impact of individuals, organizational structure, and environment on organizational innovation. Stanford University: Stanford Center for Research and Development in Teaching, 1974. (ED 091 856)
- Bloom, B. S. Human characteristics and school learning. New York: McGraw-Hill, 1976.
- Bowers, J. E. Student learning: A cognitive perspective. Philadelphia: Research for Better Schools, 1978.
- Carroll, J. B. A model for school learning. Teachers College Record, 1963, 64, 723-733.
- Centra, J. A. and Potter, D. A. School and teacher variables influencing student achievement. Philadelphia: Research for Better Schools, 1977.
- Connolly, J. A. and McGrail, J. School variables affecting student learning. Philadelphia: Research for Better Schools, 1978.
- Cooley, W. A. and Leinhardt, G. The application of a model for investigating classroom processes. Pittsburgh: Learning Research and Development Center, 1975.
- Doyle, W. Paradigms for research on teacher effectiveness. In L. S. Shulman (Ed.) Review of Research in Education, Volume 5. Itasca, Illinois: Peacock, 1977.
- Egan, D. E. and Greeno, J. G. Acquiring cognitive structure by discovery and rule learning. Journal of Educational Psychology, 1973, 64, 85-97.

- Fullan, M. and Pomfret, A. Research on curriculum and instruction implementation. Review of Educational Research, 1977, 47, 335-397.
- Hanna, E. M. Two perspectives on implementation: An exploration of school district adaptation to and interaction with an external agency. Philadelphia: Research for Better Schools, 1978.
- Kulhavy, R. W. Feedback in written instruction. Review of Educational Research, 1977, 47, 211-232.
- Mayer, R. E. Information processing variables in learning to solve problems. Review of Educational Research, 1975, 45, 525-541.
- Mayer, R. E. An informational processing approach to school learning outcomes. Philadelphia: Research for Better Schools, 1977.
- Rosenshine, B. Classroom instruction. In N. L. Gage (Ed.) The psychology of teaching methods. Seventy-fifth Yearbook of the National Society for the Study of Education. Chicago: University of Chicago Press, 1976.
- Stearns, M. S. Evaluation of the field test of project implementation packages: Volume I. Stanford, California: Stanford Research Institute, 1977.
- Temkin, S. School improvement processes and external agency roles. Philadelphia: Research for Better Schools, 1978.
- Weiner, B. Motivation from the cognitive perspective. In W. K. Estes (Ed.) Handbook of learning and cognitive processes. Volume 3: Approaches to human learning and motivation. Hillsdale, New Jersey: Erlbaum, 1976.

PART III

IMPLEMENTING NEW PROGRAMS

POSSIBILITIES FOR INCREASED QUALITY CONTROL
OF
INSTRUCTIONAL MATERIALS AND PROGRAMS

Dr. Susan Klein

May 1978

109

107

"POSSIBILITIES FOR INCREASED QUALITY CONTROL
OF
INSTRUCTIONAL MATERIALS AND PROGRAMS"

Dr. Susan Klein

I. My Early Involvement In Quality Control Activities

I became concerned with the need for more systematic attention to the quality of instructional materials several years ago when I was working on managing a program to train people in educational research and development, evaluation, and dissemination, (RDD&E). At that time, some of the projects we (USOE) funded were involved with developing instructional materials for just this kind of RDD&E training. As I became serious about looking at the range of materials available for training people in RDD&E, I saw that there were very few coordinated efforts aimed at determining what was really needed. Was everything in this body of materials needed? Was there duplication? Were all the gaps for such materials filled? Were some projects' products no better than existing materials? There were a few studies of the existing or needed educational materials for RDD&E training that gave some guidance as to what was needed, but this guidance was minimal.

Later in NIE, I did an analysis to determine what RDD&E training materials existed and how they were being developed and disseminated. This analysis was to be used to plan for the R&D training program in NIE. However, the analysis report was dumped in the waste basket soon after it was completed because the entire R&D training program in NIE was abolished the next month. NIE later relented and now has a small program to try to increase the participation of women and minorities in educational R&D.

In summary, I became interested in this area of quality control for instructional materials from my experiences managing the development of materials for R&D training programs. I became involved in other NIE reviews such as a review of labs and centers of programs and products. A great deal of development was going on in the early 70's, but there was very little thought about which products were really good. The standards were poor or non existent. It seemed that lab and center staff members of other developers were simply sent into the field and told to develop a concrete product, something that people could see and which might have some impact on education. Very little guidance came from NIE.

From this initial interest in reviewing the quality of instructional products, I began to study to determine what had been done in reviewing instructional materials in other Federal programs. Some people have been trying to identify what constitutes exemplary products and programs in areas such as reading, compensatory ed., etc. Few of these efforts were very comprehensive or systematic.

II. Quality Control Phases And Mechanisms

Since I have sketched how I became interested in reviewing instructional products, I would now like to talk about quality control issues in phases of the knowledge production and utilization process. Phase one includes quality control activities during the development and production of instructional materials or programs. The second phase includes the screening activities of disseminators, or linkers, or intermediary people who have responsibilities for selecting instructional materials which they then recommend to others. At the Federal level, for example, we (the linkers and reviewers) would look at a group of products to try to identify which were good and good for what. Others have review or screening responsibilities where they examine a portion of the one-half million existing instructional products in use in one specific area to try to determine a certain

set of minimum criteria by which they can eliminate those not appropriate for particular users. The third phase that I would like to address includes the quality control activities of the actual product users who are engaged in selecting their materials or materials for their students.

During this discussion, I will also be differentiating between what I consider are the two major mechanisms of quality control: 1) evaluation, and evaluation indicates collecting user data directly from the users or from observers of user activities such as user achievement or satisfaction data; and 2) reviews. A review is much more an analytic type of approach to quality control, where the user would not necessarily be involved, but rather, experts or external people would look at the data. These experts would look at summaries of the evaluation data, the actual instructional materials, and they would talk with people in order to synthesize information about the quality of the product from multiple perspectives.

A. Quality Control During Development

Returning to Phase I quality control issues during development, I hypothesize that development projects supported by external funding are more common these days than major local development activities. Further, these externally funded projects are more likely to pay attention to quality criteria than are locally developed ones. I think the trend is toward more collection of evaluation data on the performance of materials. The additional use of experts to review the material form and content and to examine user data is less visible. There are, however, very few developers with well articulated plans who use the evaluation and review procedures to ascertain the quality of their products as compared with other products designed for similar purposes. Even commercial developers have few mechanisms with which to police the quality of their projects.

There are people outside of the education field who say that education is not a technologically advanced industry, because in the advanced technological industries, the producers have much better quality control.

Another major drawback in the production of quality educational materials is that the market is poor at identifying quality products or programs. On the producers side, one of their major quality control problems is selecting what they are going to develop. Once this decision is made they then must decide whether or not they should continue this development once it is begun. The general assumption is, that once you receive your funding, you continue your program, good or bad, regardless of formative evaluation, until the money runs out. There simply is very little quality control during the development phase of the project.

Another problem during development is that if a product is needed badly, but may be very difficult to develop, there is usually no built in redundancy. If the developer becomes discouraged and discontinues the work, there's usually no one else to salvage what was done. In other words, unlike much military procurement, in educational procurement there is generally no built in redundancy during the design and production stages.

As money becomes tighter for development, I would hope that people would pay more attention to quality control and the initial selection of instructional products that are really needed. Tight money may be beneficial if it forces people to be more selective in where they put their development money. It is also possible that the increased competition should improve quality. The negative side of tight money is that quality control activities are very costly. For example, the collection of evaluation data, the use of systematic review procedures, the actual materials revisions etc., are quite costly, and tend to slow down the development process.

Local development activities have some capability for providing ideas for large scale transportable development projects, but in most cases they aren't very likely to produce large quantities of quality materials which can be used easily in other locations.

Those are some of the major quality control problems during production and development. One major problem, that I have stressed in previous papers, is that producers and developers must generate a general set of criteria to apply to their products. Ideally these criteria would also be acceptable to an intermediary screening group as well.

It is important to try to get users involved during the development and production phase, but this involvement presents problems for quality control. Often, user desires are listed as needs of the system, but users seldom know about or avail themselves of the existing resources when they articulate these desires to producers. It's difficult to secure a match between resources and user needs in such circumstances. Also, users are not generally experts in an area they are trying to learn about. Thus it may be quite difficult for them to appropriately judge on criteria such as "content accuracy." Thus, experts are needed for content review and assistance in judging the adequacy of the methodology used to support claims of the product's effectiveness.

B. Quality Control During The Linker or Screening Phase.

Now for phase two: The role of quality control in the linking, screening, or the intermediary phase. It appears that your project fits partly into this area, and partly into the area of advocacy. Your ISSOE project is trying to manage numerous instructional materials, to help match user needs and resources appropriately, and at the same time advocating certain materials for particular groups. In a way the two are linked to the screening of materials, because you must advocate some materials over others in the matching process.

This screening procedure is similar to that of a Federal review panel. You have certain goals, and you want to have products available to cover all potential options users may have to satisfy their needs. Thus, users would be able to select from the vast body of materials that are appropriate for a particular user and a particular need. Many federal agencies, state agencies, and immediate service agencies such as BOCES, local education agencies, R&D organizations, professional organizations, etc., screen materials to supply consumer information on user options.

All of these groups play an intermediary role, yet if one looks at their criteria, it is quite evident that there is no nationwide systematic screening process. There is little sharing of information, procedures, criteria, etc., among these groups. There is no way of exchanging judgments of the quality of materials, or even of the judgments themselves of other agencies. There is no standard set of criteria which all could use. If all of these activities could become coordinated, the decisions they arrive at could be more reasoned and a great deal of time and energy could be saved.

The NIE reviews have not solved the problems of this lack of coordination or lack of criteria. A review panel which I serve on just looks at effectiveness criteria to judge the adequacy of Federally sponsored products and programs. There are a wide range of agencies, organizations, etc., which look at only one criteria. For example, various women's organizations may review materials to make sure they aren't sexist. They frequently use published guidelines to make sure there is no linguistic discrimination against women in the written material. Such reviews for sex fairness are important, but there is no articulation. For example, a state department of education may not even learn the results of the women's group review to apply when they consider sex fairness and other criteria in adopting institutional materials. So I think, the review of screening activities could be made more productive through increased coordination of the review processes.

C. Quality Control By The Users Who Select Their Own Programs
Of Products.

It is likely that the consumer or user selection of quality products is the weakest part of the entire quality control continuum in education. Most educational consumers do not have systematic, critical objective procedures to make selection decisions among the one-half million instructional materials that exist in the U.S. Since the intermediaries or screeners often are either not very helpful or the results of their work is unknown to the actual product selectors, these selectors rely on information from sales presentations, or colleagues, or simply take advantage of opportunities to obtain materials cheaply or conveniently.

Many school districts spend a good amount of time evaluating various instructional materials, but frequently do not compare materials in these evaluations. Therefore, the evaluation is somewhat hollow, because one simply says this is good or bad. And further, there is no system for sharing this local evaluation information with other LEA's. Also there is generally no feedback to the publisher. Thus, the publishers don't receive good hints on how to improve their products and the other LEA's which may be considering using that product do not learn how it worked for other LEA's with similar needs. So the lack of comparative evaluation and organized reviews is a real problem here.

Often, in product selection activities, evaluation data aren't even examined. For example a school district recently reviewed math materials which were funded by NIE. The school district selection committee did not know that this math program had already been reviewed by several committees and different agencies and that it came out fairly well. It did not know that this program had seven volumes of evaluation data. Thus, as

in many cases this local selection committee did not use any criteria related to effectiveness and they did not have any information or other reviews of the same math program. One might suggest that the whole linker, screening and user selection system is just one unarticulated mess and that there is little hope for it to improve the quality of education.

III. Summary Comments And Related Issues

There are several options to correct this situation. One of the things I've always thought about is a kind of clearing house which collects evaluation data on major instructional products that are used in elementary and secondary schools. The Federal government has helped with this synthesis of evaluation in larger program areas. For example, Title I is coming out with evaluation models which should help collect more standardized data which can then be interpreted and aggregated. Once this systematic collection of information is started, the need for better evaluation models, and more common adoption of certain models would become evident. I see it very much as an evolutionary process.

I think it is also possible to have a great deal more articulation in the quality control activities of producers, intermediary screeners and users. One thing I have already suggested is that we can at least start with more common criteria, minimum criteria which everyone payed to what I call social fairness criteria; making sure that materials and programs are not sexist or racist. Of course, I think that is great and that it should be continued. But still, so many people are not looking at the effectiveness data nor setting standard criteria for quality. Because little is being done by smaller agencies, both public and private, I think the Federal government should take some leadership in the area.

Projects like ISSOE, where you have some responsibility for doing intermediary screening and advising educators on their options for selecting different programs provide an excellent chance to collect some basic data which may be synthesized and aggregated. ISSOE also allows you to push those materials which your criteria indicate are the best. It allows you to step back and ask, "Am I doing the best thing for education? Should I be spending more of my resources looking at other things which might be available for accomplishing the same objectives rather than developing new materials." It allows you the opportunity to do some comparative data collection and to help match resources with needs. You can distinguish among the strengths and weaknesses of each program, determine marginal products, etc. ISSOE is valuable not only in what it can do to help in general product screening activities, but also in what it can do in more specialized areas such as vocational education.

I think review activities really make the most sense if you examine similar products that are clustered by content, for example those that are supposed to teach the same thing. So by using experts in content areas, experts in instructional methodology, experts in evaluation procedures, and users, to look at these materials and synthesize the information, the review process can become an effective screening device for determining strengths and weaknesses, and gaps in instructional areas.

Unfortunately, evaluation information figures very weakly in decisions, to adopt or continue the utilization of an innovation. In teacher's decisions, it barely has any importance if considered at all, and for school administrators the same is likely. In most cases, teachers haven't been educated to think that evaluation effectiveness criteria are very helpful to them. With the accountability thrust a few years ago, I kept thinking that the teachers would need this kind of information and accept it as valuable and that they would want evidence that they were using the best available materials for their children.

Unfortunately, we don't know as much about the next step "adoption" of instructional materials as we need to know. Some of our problems of insuring that evaluation and other data are used may be because we may be evaluating or using review criteria which are of minimal interest to the adopters, or because the factors associated with adoption are so political and unique at the community level that such data become irrelevant. The Educational Products Information Exchange, EPIE has a fine study about the use of instruction materials and the general area of adoption. From this study, it is evident that teachers spend very little time in selecting instruction materials. This is partly due to difficulty in accessing materials, and partly due to restrictions on use of time of individuals employed by school districts.

I was just talking to my next door neighbor who is a sixth grade teacher in an elementary school in suburban Maryland. I asked her, "What's up with your curriculum these days?" And she said, "Well, we are really into math now." I said, "Well, what are you doing?" She replied, "Well, we convinced our principal that instead of having our faculty meeting tomorrow, that it would be better for us to spend that one hour that we would have for the faculty meeting and go to the district office to look at math materials for one hour." And we both thought that she was lucky to get that one hour to select math materials for next year.

At any rate, users are not systematic in their approach, and seldom use effectiveness criteria. My experience working with user groups such as teachers, supports the notion that the users feel very unqualified to look at even summary reports on evaluation.

Most of you are aware of some of the realities of innovation in education. It is not always a rational process, at any stage, and sometimes individuals feel they just want reasons to support a change they have already made. I agree with the individual who questioned that it may be possible to influence education, not just through more research and development but through bigger and better public relations, glossier brochures,

handsome booklets, commercial TV spots, etc. Unfortunately, that advocacy approach may put us educators or screeners in the position of pushing values. Thus I believe that where possible, we should use the consumer information approach and if we must advocate and push educational products or programs. We should do so to a range of programs so that users can select according to their own values. It would be nice if there was more rationality in this process of innovation, adoption and utilization, but we have to remember some of the stark realities of the field. It simply is not enough to make the resources available. People have to be sold on their need for these resources, and so that they can be informed of their options.

Dr. Dunn, of the CIOE, has suggested that since the future of educational research is predicated on the assumption of a rational consumer model, shouldn't we verify whether or not our local public is, in fact, a rational consumer public? He suggests that we take Consumer Reports, for example, and assess the degree to which purchase decisions are predicated on their information. But, of course, the answer is already in. The consumer public isn't behaving in a totally rational way. Some of the difficulties in conducting this kind of research would be in determining all the sources of information that one uses in making a decision, the immediacy of the information, and whether in fact it can be determined if rational information was used in the decision making process and where.

In all organizations, there is probably a continuum of decisions and decision makers. A teacher probably decides which filmstrip to use while central administrators make larger programmatic decisions. Between the two lies a continuum, largely related to degree of responsibility.

The user's role in this area of quality control is somewhat elusive. Frequently, they feel that they aren't benefiting, even when they receive pre-screened materials. Perhaps one major problem is a lack of a systematic relationship with other users to identify what they have done with the particular materials in their own location.

Thus, the problem of developing rational quality control procedures and criteria which could be applied to unknown and partially irrational producers, screeners, or users remain unresolved. Efforts, such as those of ISSOE, should prove valuable in diagnosing that problem, differentiating its components, and assisting in a mutually agreeable resolution.

PROBLEMS OF CURRICULUM IMPLEMENTATION

Dr. Michael Fullan

May 1978

"PROBLEMS OF CURRICULUM IMPLEMENTATION"

Dr. Michael Fullan

I'm told that it rains quite a lot in Ithaca which reminded me of a story that can be adapted to Ithaca that actually comes from a place in Norway-Bergen. A visitor comes to Ithaca and is here for seven days and it has rained every day for seven days. And, he begins to wonder "does it always rain here?" Out on the street he stops a little girl and says to her, "Tell me, does it always rain in Ithaca?" And her answer is "Well, I don't know, I'm only ten years old." I'm sure it's not that bad. It's beautiful country. I drove down yesterday, it was nice and sunny. It's really a nice drive, the last part of it.

I will address four issues. First of all, it is necessary to answer "What is implementation?" What do people mean when they refer to curriculum implementation, or implementation of any kind of educational program? Secondly, I will identify a set of factors derived from looking at research and working in curriculum guideline implementation in Ontario which are related to effective, or ineffective implementation.

Even though the first two parts attempt to clarify the meaning of implementation, there are still some persistent dilemmas and ambiguities about how to use this thinking. The third issue is to identify implications, complexities and dilemmas that are elusive even though we try to define implementation carefully.

The fourth and last issue concerns the practical implications of the previous three. These practical implications ought to be taken into account as guidelines if one is concerned with or involved in the implementation of any set of curricula. Despite the need to develop and extend practical guidelines, it is extremely difficult to be practical without becoming misleading, simply because the problems of implementation cannot be entirely resolved by following a set of procedures. The best we can do is derive a set of guidelines which identify the things systematically to be taken into account in relation to the particular problem at hand.

"What is implementation?" Only in the past five to seven years have people gone beyond the appearance of innovation to look at what has actually happened once teachers in schools are reportedly using a particular change. Previously, researchers asked questions such as "Are you using team teaching in your school? - Yes or No." There would be a number of reports from people using and not using the innovation and identified as causes of change or resistance to it. The problem with this research was that it was based on the faulty assumption that reported use of an innovation was the same as actual use.

When people started to look at what was being used in practice, the major discovery was a great discrepancy between what the innovation was supposed to be and what was actually happening in observed situations where it was supposedly in use. And that, interestingly enough, was not always a question of people deliberately misleading researchers or

others by saying they were using something they were not using. In many cases where people actually thought they were using an innovation, a close look with any specific criteria in mind revealed the innovation was not in use. This discrepancy was an indicator of the complexity and the difficulty of achieving implementation--a process which had been hitherto misunderstood and underestimated.

What is implementation? In simple terms it is the actual use or the putting into practice of a particular change. However, it is much more complex in reality because implementation is multidimensional. For example, we could analyze a given curriculum highly or loosely developed, and ask "What are the major parts of this curriculum that people would be using if it was actually implemented? How would the situation be different if the curriculum were implemented? In answer to these questions we have identified five elements which pertain to what sociologists would call the institutionalization of change. (see figure one). Putting these five into practice would go a long way toward institutionalizing an innovation. Although the examples I use concern curriculum innovation, the concepts really apply to any kind of social program change.

Of the five elements, the first I will highlight is structural change. Curriculum change often involves a change of structures or organization. At the classroom level, structural or organizational change might involve different patterns of grouping with students, different kinds of small groups or independent work. Beyond that it

might involve team teaching or integrated studies. Career education where students spend time in the community would be a structural change between the community and the school. In any case, as with the other four dimensions an innovation can be examined in order to identify which features characterize it. Secondly, the one element that most people have traditionally focused on is the curriculum materials themselves; "Are these new materials being used by these teachers." If the answer is "yes," they are being used by these teachers or "no" they are not being used by others, then that is the measure of the use of this aspect of implementation. That again, is only part of it, in fact one of the easiest parts to measure and observe. One can also observe structural changes and find out very easily whether particular materials are being used.

The things most difficult to implement and plan for have to do with the remaining three dimensions--role behavior, knowledge/understanding and attitudes or values of the people who are the primary users of the innovation. In most cases these are teachers and students or at different levels, administrators. Implementation occurs, or does not occur, to the extent that these people change their behavior, attitudes and knowledge.

There are two types of observable behavior in connection with curriculum change. One has to do with the direct classroom or instructional behavior. It primarily involves teaching strategies and skills on the parts of teachers, and students. These are direct instructional strategies, which can be described in behavioral or role terms in some way.

Another kind of role change, one step removed from a direct instructional strategy, would have to do with the way in which people's behavior might be affected in their planning and preparatory work for teaching. This change might involve skills in diagnosis and testing, working together with other teachers, administrators or consultants, or a new role for teachers in some aspect of curriculum development or adaptation. Whatever their behaviors are, it is possible to analyze innovations in order to identify the particular behaviors in question.

The fourth dimension of implementation concerns the knowledge and understanding which users would have to possess in order to use the change. It relates to the cognitive aspect of implementation such as the knowledge and understanding about the philosophy, assumptions, goals and means of the innovation necessary in order to utilize it.

The last one, a question of commitment or value is complicated. That people have high degrees of commitment at the beginning is a condition for successful implementation, rather than part of implementation itself. However, it is usually the case that people do not know the specifics of curriculum change when it has just been introduced. It is possible for them to be highly committed, but what they are committed to is not necessarily what the innovation is. They can't know that until some of the things have been tried. It is only after detailed experience that people can come to really internalize commitment in specific terms (or reject it).

These five elements interlock in a way, such that at some point in time, one can say this teacher or this group of teachers is actually practicing and using this innovation. This static way of looking at implementation, oversimplifies, because in most cases we don't know what the innovation is in these terms at the beginning of the process. There have been tremendous development efforts. Massive sets of curriculum materials have been developed for Social Science, Science and Career Education. Some of the material might be good in its own right, but in implementation terms it is often not adequately defined at the development stage, particularly the behavioral dimensions. In fact, the actual form of implementation cannot be specified until there's been some serious attempt at implementation.

There is one other forecast that I want to make before I turn to determinants. Many agree on the need to spend more time analyzing implementation. There are two major ways to do this. We call one approach the "degree of implementation" or the "fidelity" approach, which involves specifying an innovation carefully enough in advance and planning it in a systematic way so that people will use it as intended. It is based on the assumption of a linear relationship: once the innovation is defined the true task becomes to get as many people to use it as faithfully as possible. Measurement then focuses on the fidelity of implementation in use.

The other approach, "mutual adaptation", is closer to the realities of curriculum change and follows from the idea that an innovation too specified in advance is misleading. The specifics of its use depend on teachers, students and others in that local situation adapting to

find the best fit between a good external idea and local conditions. Mutual adaptation occurs as the externally developed idea comes into practice. After the process of mutual adaptation, we could at some point in time measure and define what the innovation is in a particular situation. The definition of what the innovation is depends on the stage of the implementation process and is open-ended, although it can be described at different points in time.

I would like to turn to a brief discussion of what might be called determinants of implementation. We think of the implementation box as including the five elements just discussed. The question is, what things, either planned or unplanned, determine the likelihood that an innovation will be implemented in the five mentioned aspects, independent of whether it is a curriculum defined by somebody else, or worked out with teachers? Figure two, lists nine factors which we have found to be consistently related to whether or not implementation occurs. Based on case studies, reviews of other research and our field work, these nine factors seem to be universally present in situations of attempted educational change.

These determinants, stated in practical terms contribute to an explanation of implementation. They are interactive ingredients that any systematic guideline should take into account. Pre-history applies almost everywhere because of past failures of positive implementation. The more that teachers have had negative experiences with previous implementation attempts, the more cynical and skeptical they will be with the next one that comes along even regardless of the quality of

the new program. Seymour Sarason developed this theme in his book The Culture of the School (Allyn and Bacon 1971). This highly important theme is, in most cases, a phenomenological variable in the sense that phenomenologically understanding teachers' orientation to a new curriculum innovation requires an understanding of teachers past experiences with innovations. Quite often innovations are developed by external people or perhaps decided upon by administrators, and don't last very long. In two or three years something new comes along after a lot of cost and few benefits. Therefore, teachers are not enthusiastic about participating on a wide scale in implementation.

Most implementation tends to ignore this factor. People may know it, and almost everybody knows it once you describe it, but it's never planned for or never taken into account that explicitly. People can go about and develop the best possible implementation plan but they leave that factor aside. Certain things have to be done to deal with this kind of attitude that teachers have had as an aside. Teachers, over time, would probably be right to maintain that attitude or would have been right historically in more cases than not.

The second and third determinants have already been referred to in our discussion of the definition of implementation. Most examples of curriculum innovation fail to define, identify and plan for the user's role change. Any curriculum may be analyzed by an approach asking; "What does this written document say about the role changes?" "Are these role changes instructional or planning and preparatory ones?" Analysis identifies more role changes than are usually explicit or manageable and further reveals ambiguity and incompatibility between

kinds of role changes that advocate, for example, student inquiry with those that advocate changes in assessment procedures. Often a curriculum innovation gives inadequate attention to the dynamics of role change both as unlearning of previous roles and learning of new roles. This factor highlights the importance of and the need to spend time on sorting out the role changes implicit to this innovation.

This procedure begins to define the innovation more carefully and uncovers whether these particular role changes are identified, desirable, incompatible, realistic. People can begin to develop the instructional strategies. This factor, in planned implementation, suggests that role change has to be dealt with explicitly, not in the usual fuzzy manner. In fact when we eventually measure the failure of implementation, we often measure the failure of people to change their behavior in role terms. To bring about role change is extremely complex. An example of how bad the situation can be is a new set of curriculum guidelines produced by the Ministry of Education in Ontario on different subject areas for grades 7 to 10. One of my colleagues analyzed the English guidelines for the intermediate years in terms of stated or implied teaching strategies. In the first sixty pages of the document he identified 261 teaching strategies! It shows how ludicrous it is to expect all of these to be in place or to expect people to know which are desirable. What is a reasonable number? What are the important ones?

In these cases, the guidelines go to teachers. In workshops they really don't deal explicitly with the distinction between the content and role aspects of the change. Related to this problem is the third determinant--the overall clarity of the innovation.

Quite often a curriculum clearly states objectives, but not the means of implementation. I'm not saying that clarity is something that should be quickly settled in advance. But, a focus on increasing the clarity of the curriculum innovation should be part of the plan. Its importance, for example, regarding new teaching roles has just been described.

In-service training concerning implementation problems is very important. The usual way of introducing the curriculum has been to provide what is called in-service workshops but they are pre-implementation in-service workshops where teachers are given an introduction and some training for a particular innovation prior to the use of it. After that in-service workshop, they go about trying to implement it, or maybe not. There is very little follow-up. Research indicates the problems caused by using only pre-implementation training. More important is to work out follow-up in-service, periodic workshops with teachers as they experience the implementation problems. These workshops can be more specifically related to what the problems are.

In this process people are re-socializing themselves and being re-socialized as is the case in relation to the fifth factor. In a re-socialization process people are engaging in interaction around new ideas in groups. The logistics vary according to the level of the problem. It could be set up in an individual school by a principal or it could be across

Schools on a small scale but the need is for small groups of people who are working with similar ideas to get together on a systematic basis (not necessarily each week). In addition to providing support for each other and exchanging valuable program information concerning implementation problems, such forums could also be used to identify specific in-service training needs. The key is the interaction component.

Other studies have pointed to the importance of local adaptations of materials as a factor contributing to successful implementation. A Rand Corporation report stated that adopting an external curriculum as a package leads to less successful implementation than adopting the material with adaptations or further development. (Berman & McLaughlin, 1977). This claim fits into the mutual adaptation approach and the role of resocialization. People are more likely to become involved in a successful attempt at change if they are actually working with the materials and making adaptations while interacting with each other. A strategy which emphasizes faithful implementation discourages any variations of use whereas a strategy which anticipates and promotes further development of materials takes advantage of factors related to successful implementation.

Administrative support is an obvious determinant factor, both as support from the top and at the level of actual use. The "top" provides resources and approval. Administrative support at the level of actual use (principal of the school, consultant or someone in charge of a project) is much more specific and may involve support for in-service training or new materials. The role of the administrator as a change agent is not well defined in

specific terms. The main role as we see it is to design and monitor a plan which systematically addresses the other eight factors. That is, a coherent plan which facilitates implementation by taking into account the key determinants.

The final two factors concern the time frame for expecting implementation facilitation. If we think particularly of role change factors, almost invariably people's expectations for the time to implement a curriculum, are too short. Political realities, administrative decisions, Federal Funding decisions, the number of changes expected from different sources are always more complex and time-consuming than anticipated. Moreover, one teacher may be dealing with several changes at once, a new curriculum here, community program in another area. The sheer overload that teachers experience makes successful change virtually impossible. Such conditions require a strategy which assigns priority to one's activities and a time frame which is realistic and specific.

Usually a curriculum contains a set of objectives for the students as learning outcomes in achievement, attitude or skills. I've been discussing what happens between the actual objectives and content of the curriculum on the one hand, and learning outcomes on the other hand. Implementation is the intervening variable(s) between these two sets of factors. We move through a set of factors which influence whether or not implementation occurs which in turn influences whether learning outcomes are achieved. So in a sense, implementation is whether or not something is in practice. Knowing whether or not it is in practice allows us to assess its influence on learning. It may turn out to have little influence--a fact which would call into question the value of the particular change.

Some of the previous assessments and evaluation have by-passed the question of implementation. There is an article called "On The Risk of Appraising Non-events," a non-event being, an innovation which is assumed to have been implemented, but actually is not (Charters and Jones). For example, open plan and conventional plan schools may be assessed in terms of student achievement. If the degree of implementation (our five dimensions) is not examined, it may hide the possibility that some open plan schools are not actually "open" in their operation. (In fact some conventional plan schools may have higher degrees of implementation.) Without attention to implementation the assessment proceeds blindly. The evaluation question, then, is the question of focusing on an outcome which is eventually important, but also the practice of evaluating in a more formative way the degree implementation.

The practical implications of defining implementation pose a dilemma. There is the need to have clarity and specificity but it is also important to avoid specific definition which precludes adaptation. Users ought to interact and adapt the innovation to their situation. Probably the most desirable approach is open-ended, defining and redefining the innovation as it is used. That procedure is not very comfortable for cognitive clarity or from a political or administrative point of view.

The complexity of learning and unlearning roles (re-socialization) is also a perennial problem. The question centers upon teacher involvement. The charge has been made that one reason why new programs fail to get implemented is because teachers are not involved. Teacher involvement

improves implementation, they say, by raising commitment and ensuring greater relevance of the curriculum to the teachers. Placing teachers on planning committees or hiring them in development roles, however, has seldom improved implementation because only a small number of teachers can be involved this way. Furthermore, the total task focuses on curriculum development not implementation.

Many curriculum development efforts do produce curricula and there are several examples where teachers in a school district had major roles in curriculum development, spending time during summers to produce curriculum in a given subject area. Once disseminated and introduced to the rest of the teachers in the system, these curricula suffer implementation problems the same as if introduced by a publisher, University or other central source because the rest of the teachers in that system are receiving curriculum they have had no part in developing. It is obvious that all teachers cannot be involved in all efforts, and to focus totally on teacher-directed curriculum development, with the expectation that other teachers will use it, simply does not work.

In general terms, there is no set of steps that would ensure implementation, although we have already indicated the types of steps to be taken. The problem is complex and the widespread implementation of a new idea is an impossibility in a short space of time. The realistic picture is pessimistic, but not without hope. The key question is "What approach will increase the likelihood that more desirable things will happen?" Still, we recognize that one will not achieve 100% of the curriculum implementation.

The next key step is to develop a plan which takes into account the five dimensions and nine factors of implementation and to address the problem of their interaction. A curriculum innovation should be analyzed in order to extract dimensions. The analysis should also ask, "What are some of the particular teaching strategies, and role changes implicit in this curriculum?" In effect, an analysis of (1) curriculum content, and (2) required changes in personnel roles, and a procedural plan as to the tasks, responsibilities and timing for addressing the various issues.

Extracting and planning for role changes requires the curriculum users to determine which roles are most desirable. If we define implementation in terms of re-socialization of people who may even engineer their own re-socialization, then we are describing a system based on interaction, a network system. The major way that people are going to change is a part of a network, whether large or small scale.

Learning theory provides a useful analogy if we think of implementation as learning by people who are involved in the process of implementation. The thinking of people who advocate student involvement and inquiry learning in a sense reflect the same principles that apply to the implementation of curriculum as an interaction network. Implementation re-socialization is none other than learning by adults and others.

Though the whole problem of implementation is too large to resolve, the question: "What accomplishments are realistic?" deserves consideration. Amidst this consideration come the common refrains, "teachers never had enough time; we can't expect teachers to spend a lot of time; there never is enough money to free-up large groups of teachers; and, some teachers are not interested; etc."

There's probably a small group of teachers who use materials as they see fit, would put in a lot of effort, regardless of accompanying problems. They might change through the use of good materials. There is also probably a group of teachers who don't want to spend a great deal of time on curriculum development or curriculum adaptation. I don't know how to estimate the size of these two groups—it depends on the particular school system.

There is a third and more interesting group of teachers who are potentially interested in implementation efforts. They need a better plan of support than they have known in the past. Their resistance rests on the reality that past change brought more costs than benefits. The development of their potential depends upon removing and reducing risks. This group, if stimulated, could include more members than suspected and offers the greatest possibilities for success. It is here that curriculum innovators should apply the bulk of their time and effort. Thus, the implementation objective should be to stimulate more teachers to engage in the resocialization necessary for basic changes to occur.

FIGURE ONE: WHAT IS IMPLEMENTATION?

FIVE COMPONENTS OF IMPLEMENTATION

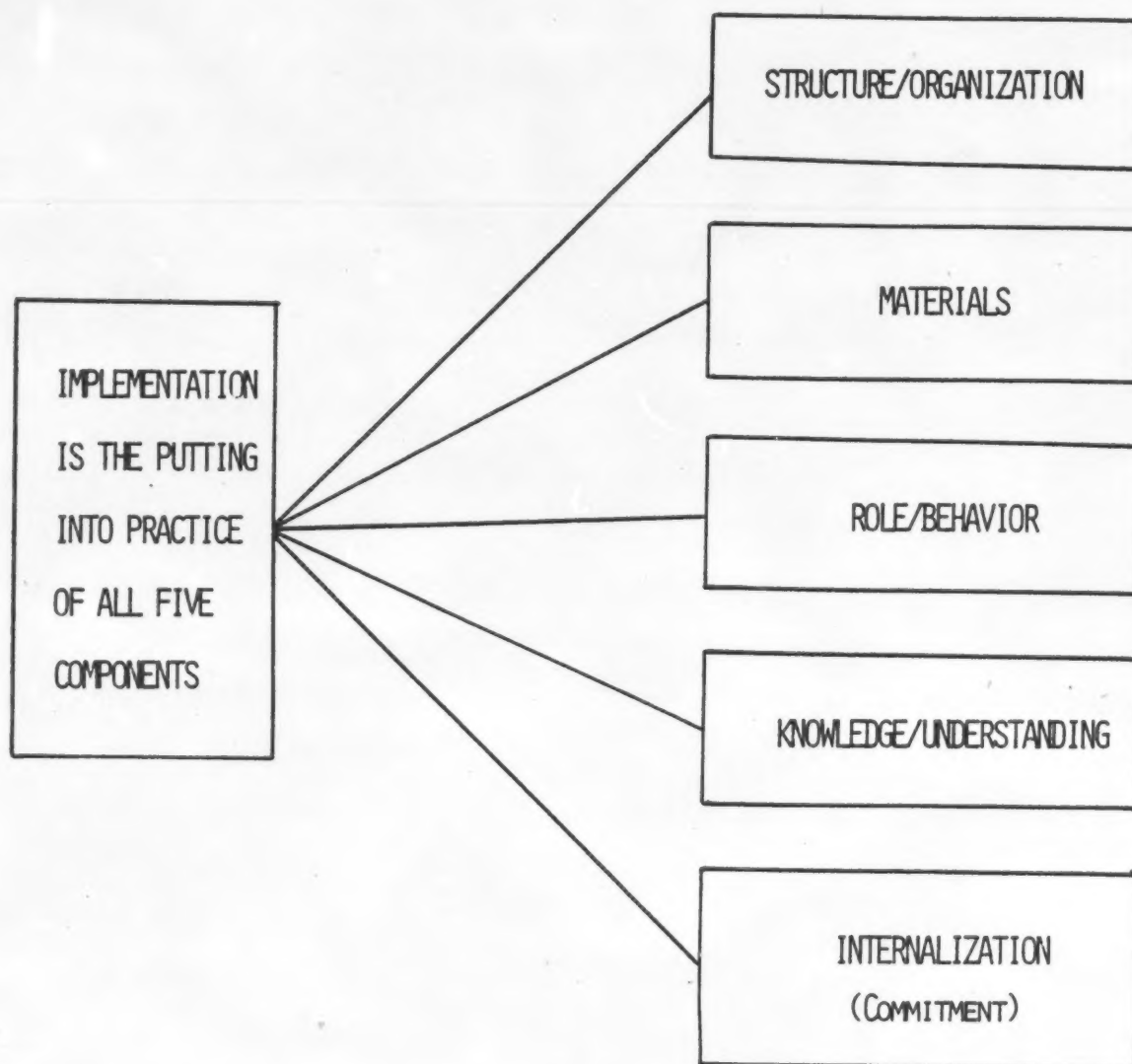
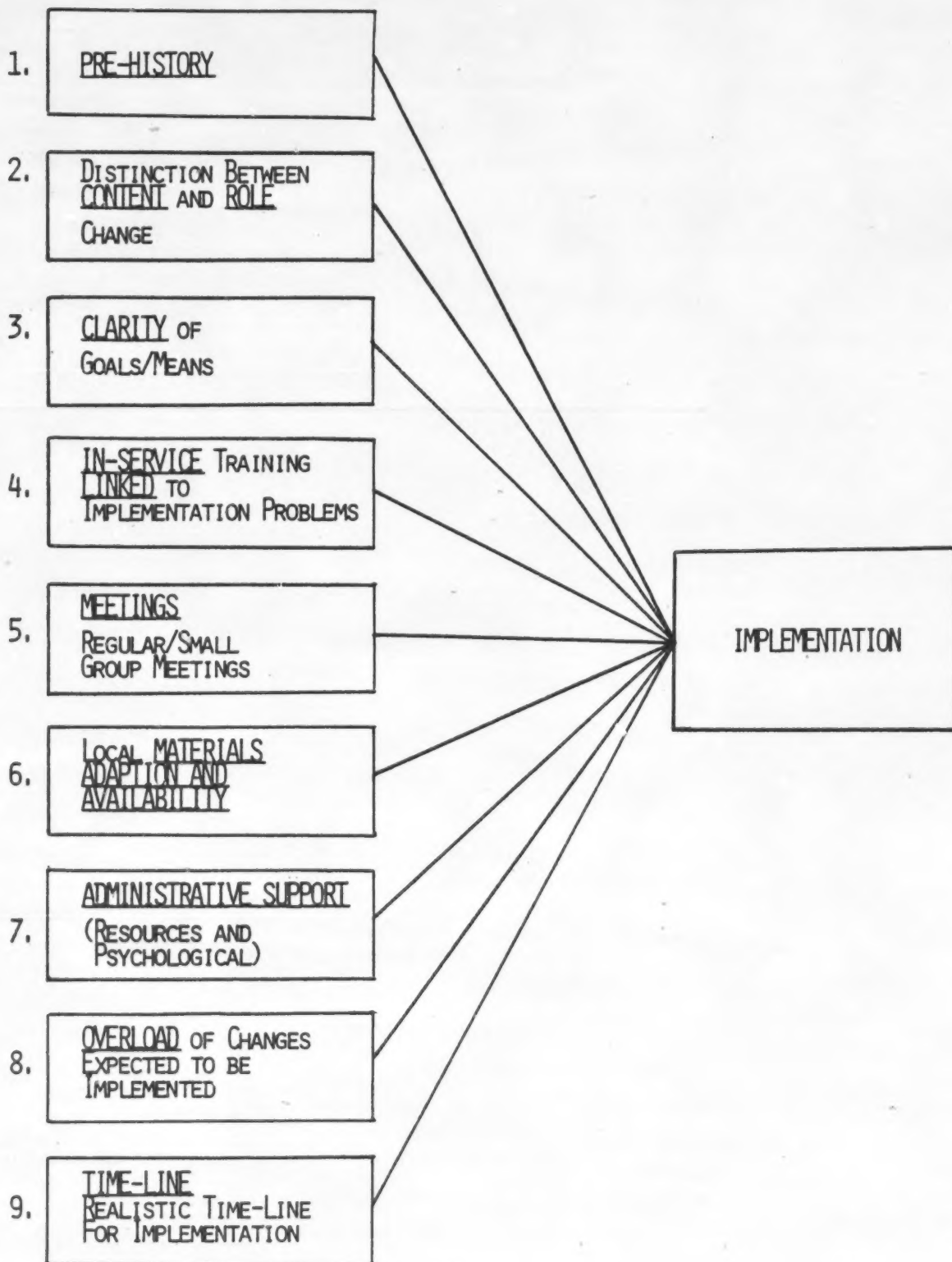


FIGURE TWO: FACTORS RELATED TO (IN)EFFECTIVE IMPLEMENTATION



REFERENCES

Berman, P., & McLaughlin, M. Implementation of Educational Innovation, Educational Forum, 1976, XL (3), 347-370.

Fullan, M., & Pomfret, A., Research on Curriculum and Instruction Implementation, Review of Educational Research, Spring 1977, Vol. 47, No. 2, pp. 335-397.

Sarason, S., The Culture of the School and the Problem of Change, Boston: Allyn and Bacon, 1971.